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**********************************
*      W E L C O M E  T O  T H E      *
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=> s array or arrays

     178516 ARRAY
      56414 ARRAYS
L1   187352 ARRAY OR ARRAYS

=> s  electric? (2W) (field# or potential#)

     822696 ELECTRIC?
    1204192 FIELD#
     309890 POTENTIAL#
L2    79502 ELECTRIC? (2W) (FIELD# OR POTENTIAL#)

=> s sputter? or  coat#### or plate#
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=> s sputter? or  coat#### or plat#### or electroplat#### or shadow###

      43153 SPUTTER?
     447231 COAT####
     881719 PLAT####
      15782 ELECTROPLAT####
      22240 SHADOW###
L3  1121597 SPUTTER? OR  COAT#### OR PLAT#### OR ELECTROPLAT####
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DOW
         ###

=> s l1 (5a) l2 (5a) l3

L4        20 L1 (5A) L2 (5A) L3

=> d 1-20
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1. 5,810,988, Sep. 22, 1998, Apparatus and method for generation of microspheres of metals and other materials; Charles Vincent Smith, Jr., et al., 204/666; 239/4, 102.2, 135; 347/1 [IMAGE AVAILABLE]

2. 5,671,633, Sep. 30, 1997, Plate array for moisture sensor with reduced sensitivity to loading effects; Edward Duane Wagner, 73/73; 324/688 [IMAGE AVAILABLE]

3. 5,539,279, Jul. 23, 1996, Ferroelectric memory; Kan Takeuchi, et al., 365/145, 149, 203 [IMAGE AVAILABLE]

4. 5,504,438, Apr. 2, 1996, Testing method for imaging defects in a liquid crystal display substrate; Francois J. Henley, 324/770, 96, 753 [IMAGE AVAILABLE]

5. 5,455,786, Oct. 3, 1995, Ferroelectric memory; Kan Takeuchi, et al., 365/145, 149, 203 [IMAGE AVAILABLE]

6. 5,273,910, Dec. 28, 1993, Method of making a solid state electromagnetic radiation detector; Nang T. Tran, et al., 438/69, 73 [IMAGE AVAILABLE]

7. 5,235,195, Aug. 10, 1993, Solid state electromagnetic radiation detector with planarization layer; Nang T. Tran, et al., 257/59, 291, 292, 444, 448; 438/59 [IMAGE AVAILABLE]

8. 5,182,624, Jan. 26, 1993, Solid state electromagnetic radiation detector FET array; Nang T. Tran, et al., 257/40; 250/338.1, 338.3, 338.4, 370.08, 370.09, 580; 257/41, 59, 292, 442, 444; 438/59, 69 [IMAGE AVAILABLE]

9. 5,174,159, Dec. 29, 1992, Linear displacement and strain measuring apparatus; Stephen C. Jacobsen, et al., 73/767, 777, 780; 327/427 [IMAGE AVAILABLE]

10. 4,736,342, Apr. 5, 1988, Method of forming a field plate in a high voltage array; Giuliano Imondi, et al., 365/185.05; 257/316; 365/53, 94, 185.1, 185.23 [IMAGE AVAILABLE]

11. 4,541,910, Sep. 17, 1985, Method for electroblotting macromolecules from a chromatographic gel; Fred E. Davis, III, et al., 204/464, 456 [IMAGE AVAILABLE]

12. 4,469,582, Sep. 4, 1984, Electrically enhanced inclined plate separator; Kerry L. Sublette, et al., 204/666, 673; 210/521 [IMAGE AVAILABLE]

13. 4,354,111, Oct. 12, 1982, Screen lens array system; Norman Williams, et al., 250/396R, 492.2 [IMAGE AVAILABLE]

14. 4,220,975, Sep. 2, 1980, Proximity focused shutter tube and camera; Albert J. Lieber, et al., 348/367; 313/105CM [IMAGE AVAILABLE]

15. 4,116,544, Sep. 26, 1978, Liquid crystal reflective display apparatus; Richard A. Soref, 349/141, 155, 156 [IMAGE AVAILABLE]

16. 4,001,102, Jan. 4, 1977, Process for generating periodic non-uniform electric field, and for removing polarizable particulate material from fluid, using ferroelectric apparatus; Howard D. Batha, et al., 204/547, 571; 435/173.9 [IMAGE AVAILABLE]

17. 3,930,982, Jan. 6, 1976, Ferroelectric apparatus for dielectrophoresis particle extraction; Howard D. Batha, e[illegible]04/660, 665, 672, 674 [IMAGE AVAILABLE]

18. 3,757,351, Sep. 4, 1973, HIGH SPEED ELECTOSTATIC PRINTING TUBE USING
A MICROCHANNEL PLATE; Robert A. Simms, 347/121; 313/105R [IMAGE AVAILABLE]

19. 3,701,122, Oct. 24, 1972, FERROELECTRIC DOMAIN SHIFTING DEVICES; Joseph Edward Geusic, et al., 365/110; 257/215; 359/107, 259; 365/121, 145, 157 [IMAGE AVAILABLE]

20. 3,655,265, Apr. 11, 1972, RESONANT PIEZOELECTRIC ACOUSTO-OPTIC LIGHT
FILTER AND APPARATUS USING SAME; Donald L. Hammond, 359/308, 310, 313 [IMAGE AVAILABLE]

=> d 1 kwic

US PAT NO: 5,810,988 [IMAGE AVAILABLE] L4: 1 of 20

SUMMARY:

BSUM(50)

In . . . plates. The charged liquid droplets are solidified in flight into solid charged microspheres. The microsphere transport system comprises a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers, and a plurality of positive and a plurality of negative electrodes. . .

DETDESC:

DETD(62)

FIG. . . . the stacked bar array used to create an electronically stabilized portion of an electrostatic "traveling wave" electric field. The stacked **array** is comprised of equally-spaced **electric** **field** electrode **plates** 1601 disposed between electric insulation spacers 1602 to provide an assembly of alternating electric field electrode plates 1601 (three are. . .

CLAIMS:

CLMS(4)

4. The apparatus of claim 2, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

CLAIMS:

CLMS(16)

16. The apparatus of claim 12, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

CLAIMS:

CLMS(23)

23. The apparatus of claim 22, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

CLAIMS:

CLMS(29)

29. The apparatus of claim 28, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

=> d 2-20 cit kwic

2. 5,671,633, Sep. 30, 1997, Plate array for moisture sensor with reduced sensitivity to loading effects; Edward Duane Wagner, 73/73; 324/688 [IMAGE AVAILABLE]

US PAT NO: 5,671,633 [IMAGE AVAILABLE] L4: 2 of 20

DETDESC:

DETD(12)

Referring again to FIG. 4, when driven with the transmitter signal 84, the transmitter **plates** 42 on the **plate** **arrays** 20, 21 produce **electrical** **fields** 90-91 which overlap in the space between the plate arrays through which the lumber 80 passes. The phase **plates** 46 on the **plate** **arrays** 20-21 produce counteracting **electrical** **fields** 92-95 at the ends of the plate arrays which act to block or reduce the amount of the electrical fields. . .

3. 5,539,279, Jul. 23, 1996, Ferroelectric memory; Kan Takeuchi, et al., 365/145, 149, 203 [IMAGE AVAILABLE]

US PAT NO: 5,539,279 [IMAGE AVAILABLE] L4: 3 of 20

DETDESC:

DETD(46)

FIG. 17 is a circuit diagram showing a configuration of a circuit for supplying a **plate** **electric** **potential** in the ferroelectric memory **array** shown in FIG. 1.

4. 5,504,438, Apr. 2, 1996, Testing method for imaging defects in a liquid crystal display substrate; Francois J. Henley, 324/770, 96, 753 [IMAGE AVAILABLE]

US PAT NO: 5,504,438 [IMAGE AVAILABLE] L4: 4 of 20

DETDESC:

DETD(2)

The . . . lamp. An electro-optical array plate 2 having an array of elements which changes the plate's irradiation response characteristics when an **electric** **field** is applied. This **array** **plate** 2 is composed of an LC sheet 8 with sealed-in polymer-dispersed liquid crystal of high molecular weight and a non-conductive. . .

DETDESC:

DETD(5)

First, . . . will result in a non-uniform voltage distribution. The LC molecules align themselves in one direction under the influence of the **electric** **field** created by the electro-optical **array** **plate** 2, and the LC sheet 8 becomes transparent to light. Under this condition if the light source 1 is turned. . .

5. 5,455,786, Oct. 3, 1995, Ferroelectric memory; Kan Takeuchi, et al., 365/145, 149, 203 [IMAGE AVAILABLE]

US PAT NO: 5,455,786 [IMAGE AVAILABLE] L4: 5 of 20

DETDESC:

DETD(20)

FIG. 10 is a circuit diagram showing a configuration of a circuit for supplying a **plate** **electric** **potential** in the ferroelectric

memory **array** shown in FIG. 1.

6. 5,273,910, Dec. 28, 1993, Method of making a solid state electromagnetic radiation detector; Nang T. Tran, et al., 438/69, 73 [IMAGE AVAILABLE]

US PAT NO: 5,273,910 [IMAGE AVAILABLE] L4: 6 of 20

DETDESC:

DETD(73)

Poling of the PVF.sub.2 blend was accomplished by placing the **coated** **array** in an **electric** **field** of suitable strength to set the dipole moment of the PVF.sub.2. The apparatus 75 of FIG. 8 is useful to. . .

7. 5,235,195, Aug. 10, 1993, Solid state electromagnetic radiation detector with planarization layer; Nang T. Tran, et al., 257/59, 291, 292, 444, 448; 438/59 [IMAGE AVAILABLE]

US PAT NO: 5,235,195 [IMAGE AVAILABLE] L4: 7 of 20

DETDESC:

DETD(73)

Poling of the PVF.sub.2 blend was accomplished by placing the **coated** **array** in an **electric** **field** of suitable strength to set the dipole moment of the PVF.sub.2. The apparatus 75 of FIG. 8 is useful to. . .

8. 5,182,624, Jan. 26, 1993, Solid state electromagnetic radiation detector FET array; Nang T. Tran, et al., 257/40; 250/338.1, 338.3, 338.4, 370.08, 370.09, 580; 257/41, 59, 292, 442, 444; 438/59, 69 [IMAGE AVAILABLE]

US PAT NO: 5,182,624 [IMAGE AVAILABLE] L4: 8 of 20

DETDESC:

DETD(73)

Poling of the PVF.sub.2 blend was accomplished by placing the **coated** **array** in an **electric** **field** of suitable strength to set the dipole moment of the PVF.sub.2. The apparatus 75 of FIG. 8 is useful to. . .

9. 5,174,159, Dec. 29, 1992, Linear displacement and strain measuring apparatus; Stephen C. Jacobsen, et al., 73/767, 777, 780; 327/427 [IMAGE AVAILABLE]

US PAT NO: 5,174,159 [IMAGE AVAILABLE] L4: 9 of 20

DETDESC:

DETD(18)

The . . . sensor in the array 232 is disposed opposite a respective one of the segmented tracks. Also formed on the detector **plate** 8 is a second **array** of **electric** **field** sensors 236 positioned to lie opposite the conductive finger array 212 when the emitter plate 38 and detector plate 8. . .

CLAIMS:

CLMS(9)

9. Apparatus as in claim 8 wherein said detector means comprises a first plurality of **electric** **field** sensors disposed in an **array** on the detector **plate**, generally transversely of the tracks, for detecting variations in the electric field patterns as the emitter plate moves.

CLAIMS:

CLMS(14)

14. . . . fields when the emitter element sections produce electric fields, and wherein said detector means further comprises a second plurality of **electric** **field** sensors disposed in an **array** on the detector **plate** opposite the array of conductive fingers on the emitter plate for detecting va[illegible]n in electric field strength emanating from the. . .

10. 4,736,342, Apr. 5, 1988, Method of forming a field plate in a high voltage array; Giuliano Imondi, et al., 365/185.05; 257/316; 365/53, 94, 185.1, 185.23 [IMAGE AVAILABLE]

US PAT NO: 4,736,342 [IMAGE AVAILABLE] L4: 10 of 20

SUMMARY:

BSUM(7)

According . . . and associated odd and even row lines, sense lines, and left and right column lines and metal ground lines. The **array** has **electrically** conducting **field** **plates** between the row line and the field oxide. The field plates are electrically isolated. Row line driver means drives an. . .

11. 4,541,910, Sep. 17, 1985, Method for electroblotting macromolecules from a chromatographic gel; Fred E. Davis, III, et al., 204/464, 456 [IMAGE AVAILABLE]

US PAT NO: 4,541,910 [IMAGE AVAILABLE] L4: 11 of 20

DETDESC:

DETD(2)

One . . . generate predictably uniform electric fields, i.e., fields without undesirable detectable changes in field intensity. The standard procedure employed to produce **electric** **fields** has been to use an **array** of **platinum** wire as the electrode. In practice, arrays of various configurations have been employed. The goal in routing the platinum wires. . .

12. 4,469,582, Sep. 4, 1984, Electrically enhanced inclined plate separator; Kerry L. Sublette, et al., 204/666, 673; 210/521 [IMAGE AVAILABLE]

US PAT NO: 4,469,582 [IMAGE AVAILABLE] L4: 12 of 20

DETDESC:

DETD(25)

The parallel **plates** 22, 22' of **array** 21 provide a homogeneous **electric** **field** of constant strength at the entrance of their passageway, followed by a degrading portion of the field. Note that the. . .

CLAIMS:

CLMS(1)

We . . .
passageways provided between the plates of the array;
and an electrical source connected to the electrically conductive first section of each **plate** of the **array** to generate an **electric** **field** in each passageway formed between the plates of the array;
whereby the liquid mixture is first exposed to the electric field. . .

13. 4,354,111, Oct. 12, 1982, Screen lens array system; Norman Williams, et al., 250/396R, 492.2 [IMAGE AVAILABLE]

US PAT NO: 4,354,111 [IMAGE AVAILABLE] L4: 13 of 20

ABSTRACT:
A . . . upper lens plate, which serve as apertures to control image aberrations. The larger set of apertures, of the lower lens **plate**, are influenced by the **electric** **field** between the screen lens **array** and the target surface to form the embodiment of most of the lens action.
Mounted above and displaced from the screen. . .

14. 4,220,975, Sep. 2, 1980, Proximity focused shutter tube and camera; Albert J. Lieber, et al., 348/367; 313/105CM [IMAGE AVAILABLE]

US PAT NO: 4,220,975 [IMAGE AVAILABLE] L4: 14 of 20

ABSTRACT:
A . . . between each plate whereby an electrical field can be

established across each plate. By applying a ramp voltage to alternate **plates** in the stacked **array**, the **electric** **field** across each **plate** deflects a photoelectron beam and allows a momentary period of transmission of the beam through the microchannels. The electrode on. . .

SUMMARY:

BSUM(13)

Briefly, . . . microchannel plates which are stacked in an array with conductive electrodes between adjacent plates. By applying a ramp-voltage to alternate **plates** in the stacked **array**, an **electric** **field** is developed across each microchannel **plate** whereby a photo-electron beam can be deflected and obtain a momentary period of transmission. The camera can develop multiple frames. . .

DETDESC:

DETD(6)

In . . . of the shutter voltage applied to terminal 34. It will be appreciated that with the alternate connection of the shutter **array** electrodes, the **electric** **field** in each MCP **plate** actually reverses. However, the system is symmetric so gating is attained in the sub-structures regardless of whether photo-electrons for that. . .

15. 4,116,544, Sep. 26, 1978, Liquid crystal reflective display apparatus; Richard A. Soref, 349/141, 155, 156 [IMAGE AVAILABLE]

US PAT NO: 4,116,544 [IMAGE AVAILABLE] L4: 15 of 20

DETDESC:

DETD(6)

Referring . . . an electric field of a reversed sense is found between electrodes 23 and 29, and so on throughout the interleaved **array** of electrodes. The **electric** **fields** lie primarily parallel to **plates** 10, 11, although the fields also fringe somewhat in other directions.

16. 4,001,102, Jan. 4, 1977, Process for generating periodic non-uniform electric field, and for removing polarizable particulate material from fluid, using ferroelectric apparatus; Howard D. Batha, et al., 204/547, 571; 435/173.9 [IMAGE AVAILABLE]

US PAT NO: 4,001,102 [IMAGE AVAILABLE] L4: 16 of 20

DETDESC:

DETD(39)

Other . . . may have advantages in situations in which a number of parallel plates of ferroelectric material 21 are arranged in close **array**, so that the overlapping **electric** **fields** from adjacent **plates** can be correlated in their directions. In FIG. 15, as in FIG. 16, the portions of the ferroelectric material whose. . .

17. 3,930,982, Jan. 6, 1976, Ferroelectric apparatus for dielectrophoresis particle extraction; Howard D. Batha, et al., 204/660, 665, 672, 674 [IMAGE AVAILABLE]

US PAT NO: 3,930,982 [IMAGE AVAILABLE] L4: 17 of 20

DETDESC:

DETD(39)

Other . . . may have advantages in situation in which a number of parallel plates of ferroelectric material 21 are arranged in close **array**, so that the overlapping **electric** **fields** from adjacent **plates** can be correlated in their directions. In FIG. 15, as in FIG. 16, the portions of the ferroelectric material whose. . .

18. 3,757,351, Sep. 4, 1973, HIGH SPEED ELECTOSTATIC PRINTING TUBE USING
A MICROCHANNEL PLATE; Robert A. Simms, 347/121; 313/105R [IMAGE AVAILABLE]

US PAT NO: 3,757,351 [IMAGE AVAILABLE] L4: 18 of 20

DETDESC:

DETD(6)

Microchannel . . . field represented by arrow B.sub.2 so that they travel in a path substantially perpendicular to the plane of the microchannel **plate** and the multilead **array**. However, if **electrical** **field** E.sub.2 is at least 10 volts/0.001 inch there will normally be no need for magnetic focusing between these two members.

19. 3,701,122, Oct. 24, 1972, FERROELECTRIC DOMAIN SHIFTING DEVICES; Joseph Edward Geusic, et al., 365/110; 257/215; 359/107, 259; 365/121, 145, 157 [IMAGE AVAILABLE]

US PAT NO: 3,701,122 [IMAGE AVAILABLE] L4: 19 of 20

CLAIMS:

CLMS(5)

5. . . . comprises:
a. a ferroelectric plate capable of supporting a polarized domain, the boundary of which can be displaced in the **plate** in response to **electric** **fields**;
b. an **array** of electrodes on a surface portion of the plate including a second electrode as next neighbor to a first electrode. .
.

20. 3,655,265, Apr. 11, 1972, RESONANT PIEZOELECTRIC ACOUSTO-OPTIC LIGHT
FILTER AND APPARATUS USING SAME; Donald L. Hammond, 359/308, 310, 313 [IMAGE AVAILABLE]

US PAT NO: 3,655,265 [IMAGE AVAILABLE] L4: 20 of 20

CLAIMS:

CLMS(8)

8. . . . a thickness mode of vibration at a different frequency, directing the light to be filtered into the array of crystal **plate** vibrators, applying the radio frequency **electric** **field** to the **array** of crystal **plate** vibrators, and varying the frequency of the applied radio frequency electric field to excite resonance of different ones of the. . .

CLAIMS:

CLMS(21)

21. . . . plate vibrators being dimensioned for a thickness mode of vibration at a different frequency, means for applying a radio frequency **electric** **field** to the **array** of crystal **plate** vibrators, and means for varying the frequency of the applied radio frequency electric field to excite resonance of different ones. . .

=> s 204/192.!?/cls

L5 4607 204/192.!?/CLS

=> s l5 l4

MISSING OPERATOR 'L5 L4'

=> s l5 and l4

L6 0 L5 AND L4

=> s l5 and l1 (p) l2 (p) l3

928 L1 (P) L2 (P) L3
L7 27 L5 AND L1 (P) L2 (P) L3

=> d 1-27

1. 5,683,558, Nov. 4, 1997, Anode structure for magnetron sputtering systems; Peter A. Sieck, et al., **204/192.12**; 118/723E; 156/345; **204/192.22**, **192.23**, 298.06, 298.08, 298.14, 298.16, 298.19, 298.21, 298.22 [IMAGE AVAILABLE]

2. 5,518,597, May 21, 1996, Cathodic arc coating apparatus and method;

Jonathan G. Storer, et al., **204/192.38**, 298.41; 427 IMAGE AVAILABLE]

3. 5,496,455, Mar. 5, 1996, Sputtering using a plasma-shaping magnet ring; Michael Dill, et al., **204/192.12**, 298.16, 298.17, 298.19, 298.2, 298.22 [IMAGE AVAILABLE]

4. 5,487,821, Jan. 30, 1996, Anode structure for magnetron sputtering systems; Peter A. Sieck, et al., **204/192.12**, 298.14, 298.19, 298.21 [IMAGE AVAILABLE]

5. 5,486,277, Jan. 23, 1996, High performance capacitors using nano-structure multilayer materials fabrication; Troy W. Barbee, Jr., et al., **204/192.15**, **192.17**, **192.22**, **192.23**; 216/6 [IMAGE AVAILABLE]

6. 5,407,551, Apr. 18, 1995, Planar magnetron sputtering apparatus; Peter A. Sieck, et al., 204/298.19, **192.12**, 298.09, 298.16 [IMAGE AVAILABLE]

7. 5,338,422, Aug. 16, 1994, Device and method for depositing metal oxide films; Abraham I. Belkind, et al., **204/192.12**, 298.12, 298.16, 298.19, 298.21, 298.22, 298.26 [IMAGE AVAILABLE]

8. 5,282,944, Feb. 1, 1994, Ion source based on the cathodic arc; David M. Sanders, et al., **204/192.38**, 298.41; 250/426; 313/153, 157; 427/580 [IMAGE AVAILABLE]

9. 5,047,131, Sep. 10, 1991, Method for coating substrates with silicon based compounds; Jesse D. Wolfe, et al., **204/192.23**, 298.22 [IMAGE AVAILABLE]

10. 4,812,217, Mar. 14, 1989, Method and apparatus for feeding and coating articles in a controlled atmosphere; Carroll H. George, et al., **204/192.12**; 118/718, 724; 204/298.09, 298.16, 298.25 [IMAGE AVAILABLE]

11. 4,622,122, Nov. 11, 1986, Planar magnetron cathode target assembly; Richard F. Landau, 204/298.19, **192.12**, **192.2**, 298.12, 298.13 [IMAGE AVAILABLE]

12. 4,607,193, Aug. 19, 1986, Textured carbon surfaces on copper by sputtering; Arthur N. Curren, et al., 315/5.38; **204/192.15**, 298.26; 313/106, 107; 427/524; 428/694TC [IMAGE AVAILABLE]

13. 4,450,031, May 22, 1984, Ion shower apparatus; Toshiro Ono, et al., 156/345; 118/50.1, 620, 728; **204/192.11**, 298.36; 216/66, 69; 250/492.21 [IMAGE AVAILABLE]

14. 4,431,505, Feb. 14, 1984, High rate magnetron sputtering of high permeability materials; Charles F. Morrison, Jr., 204/298.19, **192.15**, 298.16 [IMAGE AVAILABLE]

15. 4,324,631, Apr. 13, 1982, Magnetron sputtering of magnetic materials; Benjamin B. Meckel, et al., **204/192.2**, 298.03, 298.09, 298.19 [IMAGE AVAILABLE]

16. 4,299,678, Nov. 10, 1981, Magnetic target plate for use in magnetron sputtering of magnetic films; Benjamin B. Meckel, **204/192.2**, **192.15**, 298.09, 298.12, 298.19 [IMAGE AVAILABLE]

17. 4,264,393, Apr. 28, 1981, Reactor apparatus for plasma etching or deposition; Georges J. Gorin, et al., 156/345; 118/620, 728; **204/192.32**, 298.33, 298.39; 216/67; 422/186.29, 906 [IMAGE AVAILABLE]

18. 4,209,552, Jun. 24, 1980, Thin film deposition by electric and magnetic crossed-field diode sputtering; Kimo M. Welch, 427/78; **204/192.15**; 427/109, 126.1, 248.1, 255, 255.2 [IMAGE AVAILABLE]

19. 4,151,325, Apr. 24, 1979, Titanium nitride thin films for minimizing multipactoring; Kimo M. Welch, 428/432; **204/192.12**, **192.3**; 313/107; 315/5; 427/78, 109, 126.4, 248.1, 255, 255.2; 505/816, 866 [IMAGE AVAILABLE]

20. 4,006,073, Feb. 1, 1977, Thin film deposition by electric and magnetic crossed-field diode sputtering; Kimo M. Welch, 204/298.16, **192.15**, 298.06; 315/5; 427/109, 248.1 [IMAGE AVAILABLE]

21. 4,000,055, Dec. 28, 1976, Method of depositing nitrogen-doped beta tantalum; Henry Yasuo Kumagai, **204/192.15** [IMAGE AVAILABLE]

22. 3,968,018, Jul. 6, 1976, Sputter coating method; George C. Lane, et al., **204/192.3**, **192.1 98.25 [IMAGE AVAILABLE]

23. 3,916,523, Nov. 4, 1975, Coated razor blade; George C. Lane, et al., 428/624; 30/346.53; **204/192.3**, **192.32**, 298.25; 427/284, 405, 409; 428/192, 472, 632, 666, 932 [IMAGE AVAILABLE]

24. 3,847,658, Nov. 12, 1974, ARTICLE OF MANUFACTURE HAVING A FILM COMPRISING NITROGEN-DOPED BETA TANTALUM; Henry Yasuo Kumagai, 428/432;
204/192.15; 252/512; 361/305; 501/134 [IMAGE AVAILABLE]

25. 3,723,838, Mar. 27, 1973, NITROGEN-DOPED BETA TANTALUM CAPACITOR;
Henry Yasuo Kumagai, 361/322; **204/192.22**; 361/305; 501/134 [IMAGE AVAILABLE]

26. 3,616,404, Oct. 26, 1971, COMPUTER INFORMATION STORAGE DEVICE AND
METHOD FOR MAKING THE SAME; Lawrence A. Gregory, **204/192.2** [IMAGE AVAILABLE]

27. 3,616,402, Oct. 26, 1971, SPUTTERING METHOD AND APPARATUS; Henry Y. Kumagai, **204/192.12**, **192.15**, 298.06, 298.12, 298.25 [IMAGE AVAILABLE]

=> s l5 and l1 (5a) l2 (5a) l3

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        20 L1 (5A) L2 (5A) L3
L8       0 L5 AND L1 (5A) L2 (5A) L3
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=> focus l7

PROCESSING COMPLETED FOR L7
L9 27 FOCUS L7 1-

=> d -127

27 ANSWERS ARE AVAILABLE. SPECIFIED ANSWER NUMBER EXCEEDS ANSWER SET
SIZE
ENTER ANSWER NUMBER OR RANGE (1):end

=> d cit ab kwic

1. 4,151,325, Apr. 24, 1979, Titanium nitride thin films for minimizing multipactoring; Kimo M. Welch, 428/432; **204/192.12**, **192.3**; 313/107; 315/5; 427/78, 109, 126.4, 248.1, 255, 255.2; 505/816, 866 [IMAGE AVAILABLE]

US PAT NO: 4,151,325 [IMAGE AVAILABLE] L9: 1 of 27

ABSTRACT:
Applying a thin film **coating** to the surface of a workpiece, in particular, applying a **coating** of titanium nitride to a klystron window by means of a crossed-field diode **sputtering** **array**. The **array** is comprised of a cohesive group of numerous small hollow electrically conducting cylinders and is mounted so that the open ends of the cylinders on one side of the group are adjacent a titanium cathode **plate**. The workpiece is mounted so as to face the open ends of the other side of the group. A magnetic field is applied to the **array** so as to be coaxial with the cylinders and a potential is applied across the cylinders and the cathode **plate**, the cylinders as an anode being positive with respect to the cathode **plate**. The cylinders, the cathode **plate** and the workpiece are situated in an atmosphere of nitrogen which becomes ionized such as by field emission because of the **electric** **field** between the cylinders and cathode **plate**, thereby establishing an anode-cathode discharge that results in **sputtering** of the titanium **plate**. The **sputtered** titanium **coats** the workpiece and chemically combines with the nitrogen to form a titanium nitride **coating** on the workpiece. Gas pressure, gas mixtures, cathode material composition, voltages applied to the cathode and anode, the magnetic field, cathode, anode and workpiece spacing, and the aspect ratio (ratio of length to inner diameter) of the anode cylinders, all may be controlled to provide consistent optimum thin film **coatings** of various compositions and thicknesses. Another facet of the disclosure is the **coating** of microwave components per se with titanium nitride to reduce multipactoring under operating conditions of the components.
US-CL-CURRENT: 428/432; **204/192.12**, **192.3**; 313/107; 315/5;
427/78, 109, 126.4, 248.1, 255, 255.2; 505/816, 866

ABSTRACT:

Applying a thin film **coating** to the surface of a workpiece, in particular, applying a **coating** of titanium nitride to a klystron window by means of a crossed-field diode **sputtering** **array**. The **array** is comprised of a cohesive group of numerous small hollow electrically conducting cylinders and is mounted so that the open ends of the cylinders on one side of the group are adjacent a titanium cathode **plate**. The workpiece is mounted so as to face the open ends of the other side of the group. A magnetic field is applied to the **array** so as to be coaxial with the cylinders and a potential is applied across the cylinders and the cathode **plate**, the cylinders as an anode being positive with respect to the cathode **plate**. The cylinders, the cathode **plate** and the workpiece are situated in an atmosphere of nitrogen which becomes ionized such as by field emission because of the **electric** **field** between the cylinders and cathode **plate**, thereby establishing an anode-cathode discharge that results in **sputtering** of the titanium **plate**. The **sputtered** titanium **coats** the workpiece and chemically combines with the nitrogen to form a titanium nitride **coating** on the workpiece. Gas pressure, gas mixtures, cathode material composition, voltages applied to the cathode and anode, the magnetic field,. . . (ratio of length to inner diameter) of the anode cylinders, all may be controlled to provide consistent optimum thin film **coatings** of various compositions and thicknesses. Another facet of the disclosure is the **coating** of microwave components per se with titanium nitride to reduce multipactoring under operating conditions of the components.

SUMMARY:

BSUM(1)

The present invention relates to the use of crossed **electric** and magnetic **fields** in a cathode-anode diode **sputtering** **array** for deposition of a thin film on a workpiece, and more particularly, it relates to mounting the workpiece in a. . . in which the workpiece is outside the space for discharge between the anode and cathode and it further relates to **coating** a microwave component with titanium nitride to reduce multipactoring.

DETDESC:

DETD(9)

Due . . . of the anode opposite cathode 35. The high-energy ions which strike the surface of the cathode 35 result in the **sputtering** of cathode material which in turn is deposited onto the substrate 39 as discussed hereinbefore. Ions in the beam, having. . . anode and the cathode, to on the order of a few electron volts, have a trajectory on leaving the gun **array** which may be affected by the fringing magnetic field near the anode and the space charge spreading effects within the. . . mentioned hereinbefore the ion beam has the beneficial effect of "scrubbing" or cleaning the surface of the material to be **coated**, removing unwanted surface gas and contaminates to assure excellent surface bonding of the **coated** film to this surface. An advantage of this technique is that there is control of the degree of ion scrubbing of the substrate surface and heating of the substrate by appropriate choice of anode configuration, magnetic field, **electric** **potential**, and pressure. An example of such an application would be the use of a high-power ion beam to first clean off inherent aluminum oxide on an aluminum surface, then the subsequent **sputtering** of silver, copper, or other material onto the surface for subsequent joining applications.

=> d cit ab kwic 2-10

2. 4,209,552, Jun. 24, 1980, Thin film deposition by electric and magnetic crossed-field diode sputtering; Kimo M. Welch, 427/78; **204/192.15**; 427/109, 126.1, 248.1, 255, 255.2 [IMAGE AVAILABLE]

US PAT NO: 4,209,552 [IMAGE AVAILABLE] L9: 2 of 27

ABSTRACT:

Applying a thin film **coating** to the surface of a workpiece, in particular, applying a **coating** of titanium nitride to a klystron window by means of a crossed-field diode **sputtering** **array**. The **array** is comprised of a cohesive group of numerous small hollow electrically conducting cylinders and is mounted so that the open ends of the cylinders on one side of the group are adjacent a titanium cathode **plate**. The workpiece is mounted so as to face the open ends of the other side of the group. A magnetic field is applied to the **array** so as to be coaxial with the cylinders and a potential is applied across the cylinders and the cathode **plate**, the cylinders as an anode being positive with respect to the cathode **plate**. The cylinders, the cathode **plate** and the workpiece are situated in an atmosphere of nitrogen which becomes ionized such as by field emission because of the **electric** **field** between the cylinders and cathode **plate**, thereby establishing an anode-cathode discharge that results in **sputtering** of the titanium **plate**. The **sputtered** titanium **coats** the workpiece and chemically combines with the nitrogen to form a titanium nitride **coating** on the workpiece. Gas pressure, gas mixtures, cathode material composition, voltages applied to the cathode and anode, the magnetic field, cathode, anode and workpiece spacing, and the aspect ratio (ratio of length to inner diameter) of the anode cylinders, all may be controlled to provide consistent optimum thin film **coatings** of various compositions and thicknesses. Another facet of the disclosure is the **coating** of microwave components per se with titanium nitride to reduce multipactoring under operating conditions of the components.

US-CL-CURRENT: 427/78; **204/192.15**; 427/109, 126.1, 248.1, 255, 255.2

ABSTRACT:

Applying a thin film **coating** to the surface of a workpiece, in particular, applying a **coating** of titanium nitride to a klystron window by means of a crossed-field diode **sputtering** **array**. The **array** is comprised of a cohesive group of numerous small hollow electrically conducting cylinders and is mounted so that the open ends of the cylinders on one side of the group are adjacent a titanium cathode **plate**. The workpiece is mounted so as to face the open ends of the other side of the group. A magnetic field is applied to the **array** so as to be coaxial with the cylinders and a potential is applied across the cylinders and the cathode **plate**, the cylinders as an anode being positive with respect to the cathode **plate**. The cylinders, the cathode **plate** and the workpiece are situated in an atmosphere of nitrogen which becomes ionized such as by field emission because of the **electric** **field** between the cylinders and cathode **plate**, thereby establishing an anode-cathode discharge that results in **sputtering** of the titanium **plate**. The **sputtered** titanium **coats** the workpiece and chemically combines with the nitrogen to form a titanium nitride **coating** on the workpiece. Gas pressure, gas mixtures, cathode material composition, voltages applied to the cathode and anode, the magnetic field,. . . (ratio of length to inner diameter) of the anode cylinders, all may be controlled to provide consistent optimum thin film **coatings** of various compositions and thicknesses. Another facet of the disclosure is the **coating** of microwave components per se with titanium nitride to reduce multipactoring under operating conditions of the components.

SUMMARY:

BSUM(1)

The present invention relates to the use of crossed **electric** and magnetic **fields** in a cathode-anode diode **sputtering** **array** for deposition of a thin film on a workpiece, and more particularly, it relates to mounting the workpiece in a. . . in which the workpiece is outside the space for discharge between the anode and cathode and it further relates to **coating** a microwave component with titanium nitride to reduce multipactoring.

DETDESC:

DETD(9)

Due . . . of the anode opposite cathode 35. The high-energy ions which strike the surface of the cathode 35 result in the **sputtering** of cathode material which in turn is deposited onto the substrate 39 as discussed hereinbefore. Ions in the beam, having. . . anode and the cathode, to on the order of a few electron volts, have a trajectory on leaving the gun **array** which may be affected by the fringing magnetic field near the anode and the space charge spreading effects within the. . . mentioned hereinbefore the ion beam has the beneficial effect of "scrubbing" or cleaning the surface of the material to be **coated**, removing unwanted surface gas and contaminates to assure excellent surface bonding of the **coated** film to this surface. An advantage of this technique is that there is control of the degree of ion scrubbing of the substrate surface and heating of the substrate by appropriate choice of anode configuration, magnetic field, **electric** **potential**, and pressure. An example of such an application would be the use of a high-power ion beam to first clean off inherent aluminum oxide on an aluminum surface, then the subsequent **sputtering** of silver, copper, or other material onto the surface for subsequent joining applications.

3. 4,006,073, Feb. 1, 1977, Thin film deposition by electric and

magnetic crossed-field diode sputtering; Kimo M. Welch[illegible]298.16, **192.15**, 298.06; 315/5; 427/109, 248.1 [IMAGE A[illegible]ABLE]

US PAT NO: 4,006,073 [IMAGE AVAILABLE] L9: 3 of 27

ABSTRACT:

Applying a thin film **coating** to the surface of a workpiece, in particular, applying a **coating** of titanium nitride to a klystron window by means of a crossed-field diode **sputtering** **array**. The **array** is comprised of a cohesive group of numerous small hollow electrically conducting cylinders and is mounted so that the open ends of the cylinders on one side of the group are adjacent a titanium cathode **plate**. The workpiece is mounted so as to face the open ends of the other side of the group. A magnetic field is applied to the **array** so as to be coaxial with the cylinders and a potential is applied across the cylinders and the cathode **plate**, the cylinders as an anode being positive with respect to the cathode **plate**. The cylinders, the cathode **plate** and the workpiece are situated in an atmosphere of nitrogen which becomes ionized such as by field emission because of the **electric** **field** between the cylinders and cathode **plate**, thereby establishing an anode-cathode discharge that results in **sputtering** of the titanium **plate**. The **sputtered** titanium **coats** the workpiece and chemically combines with the nitrogen to form a titanium nitride **coating** on the workpiece. Gas pressure, gas mixtures, cathode material composition, voltages applied to the cathode and anode, the magnetic field, cathode, anode and workpiece spacing, and the aspect ratio (ratio of length to inner diameter) of the anode cylinders, all may be controlled to provide consistent optimum thin film **coatings** of various compositions and thicknesses. Another facet of the disclosure is the **coating** of microwave components per se with titanium nitride to reduce multipactoring under operating conditions of the components.

US-CL-CURRENT: 204/298.16, **192.15**, 298.06; 315/5; 427/109, 248.1

ABSTRACT:

Applying a thin film **coating** to the surface of a workpiece, in particular, applying a **coating** of titanium nitride to a klystron window by means of a crossed-field diode **sputtering** **array**. The **array** is comprised of a cohesive group of numerous small hollow electrically conducting cylinders and is mounted so that the open ends of the cylinders on one side of the group are adjacent a titanium cathode **plate**. The workpiece is mounted so as to face the open ends of the other side of the group. A magnetic field is applied to the **array** so as to be coaxial with the cylinders and a potential is applied across the cylinders and the cathode **plate**, the cylinders as an anode being positive with respect to the cathode **plate**. The cylinders, the cathode **plate** and the workpiece are situated in an atmosphere of nitrogen which becomes ionized such as by field emission because of the **electric** **field** between the cylinders and cathode **plate**, thereby establishing an anode-cathode discharge that results in **sputtering** of the titanium **plate**. The **sputtered** titanium **coats** the workpiece and chemically combines with the nitrogen to form a titanium nitride **coating** on the workpiece. Gas pressure, gas mixtures, cathode material composition, voltages applied to the cathode and anode, the magnetic field,. . . (ratio of length to inner diameter) of the anode cylinders, all may be controlled to provide consistent optimum thin film **coatings** of various compositions and thicknesses. Another facet of the disclosure is the **coating** of microwave components per se with titanium nitride to reduce multipactoring under operating conditions of the components.

SUMMARY:

BSUM(3)

The present invention relates to the use of crossed **electric** and magnetic **fields** in a cathode-anode diode **sputtering** **array** for deposition of a thin film on a workpiece, and more particularly, it relates to mounting the workpiece in a. . . in which the workpiece is outside the space for discharge between the anode and cathode and it further relates to **coating** a microwave component with titanium nitride to reduce multipactoring.

DETDESC:

DETD(9)

Due . . . of the anode opposite cathode 35. The high-energy ions which strike the surface of the cathode 35 result in the **sputtering** of cathode material which in turn is deposited onto the substrate 39 as discussed hereinbefore. Ions in the beam, having. . . anode and the cathode, to on the order of a few electron volts, have a trajectory on leaving the gun **array** w[illegible]ay be affected by the fringing magnetic field near the anode and the s[illegible]charge spreading effects within the. . . mentioned hereinbefore the ion beam has the beneficial effect of "scrubbing" or cleaning the surface of the material to be **coated**, removing unwanted surface gas and contaminates to assure excellent surface bonding of the **coated** film to this surface. An advantage of this technique is that there is control of the degree of ion scrubbing of the substrate surface and heating of the substrate by appropriate choice of anode configuration, magnectic field, **electric** **potential**, and pressure. An example of such an application would be the use of a high-power ion beam to first clean off inherent aluminum oxide on an aluminum surface, then the subsequent **sputtering** of silver, copper, or other material onto the surface for subsequent joining applications.

4. 3,616,402, Oct. 26, 1971, SPUTTERING METHOD AND APPARATUS; Henry Y. Kumagai, **204/192.12**, **192.15**, 298.06, 298.12, 298.25 [IMAGE AVAILABLE]

US PAT NO: 3,616,402 [IMAGE AVAILABLE] L9: 4 of 27

ABSTRACT:

Substrate heating by plasma electron bombardment during the **sputtering** of a thin film in a deposition chamber is considerably reduced by utilizing, as the **sputtering** target, an AC-excited **array** of parallel tubes formed from the film material. An oscillating **electric** **field** of large amplitude is established between adjacent ones of the tubes to entrap free electrons of the chamber gas and to thereby prevent the electrons from reaching the substrate. An auxiliary conductive member mounted adjacent and parallel to the **array** is biased with a DC voltage of selectable polarity for increasing the deposition rate of the **sputtered** material without altering the chamber pressure.

US-CL-CURRENT: **204/192.12**, **192.15**, 298.06, 298.12, 298.25

ABSTRACT:

Substrate heating by plasma electron bombardment during the **sputtering** of a thin film in a deposition chamber is considerably reduced by utilizing, as the **sputtering** target, an AC-excited **array** of parallel tubes formed from the film material. An oscillating **electric** **field** of large amplitude is established between adjacent ones of the tubes to entrap free electrons of the chamber gas and to thereby prevent the electrons from reaching the substrate. An auxiliary conductive member mounted adjacent and parallel to the **array** is biased with a DC voltage of selectable polarity for increasing the deposition rate of the **sputtered** material without altering the chamber pressure.

SUMMARY:

BSUM(7)

The current density in the cathode **array** and thus the deposition rate of the **sputtered** film may be greatly enhanced by distorting the oscillating **electric** **field** between the tubes. This may be accomplished, e.g., by mounting a conductive member behind the cathode **array** and applying either a positive or a negative DC bias to the member. For any given chamber pressure, the enhancement. . .

DETDESC:

DETD(7)

Alternate . . . terminal 45 of the source 44. Thus the entire source potential may be applied across adjacent elements 37 in the **array** to provide an intense oscillating **electric** **field** between the adjacent elements. During the half cycle of the applied AC voltage when the elements 37a, 37c, and 37e. . . with respect to the remainder of the elements, the elements 37a, 37c, and 37e constitute the instantaneous "cathode" of the **sputtering** apparatus. Similarly, when the elements 37b, 37d, and 37f are negative with respect to the remaining elements, the elements 37b,. . . and 37f constitute the instantaneous cathode. In this way, each of the elements 37 constitutes a film source of the **sputtering** apparatus. No separate anode of the type generally employed to support the substrate in diode **sputtering** apparatus is required.

DETDESC:

DETD(8)

In . . . closed to apply the high AC voltage of the source 44 between adjacent ones of the elements 37. The resulting **electric** **fields**

between the adjacent elements ionize the chamber gas so t[redacted]sitive ions of the gas bombard those elements 37 that. . '. The r[redacted]ng dislodgement of aluminum atoms from the bombarded elements are deposited on the moving substrates 32 opposite the target **array** in the form of a thin film **coating** 46 (FIG. 3). DUring the next half cycle of the source voltage, the positive gas ions bombard the remaining ones. . .

DETDESC:

DETD(9)

Free electrons in the ionized gas are trapped in the AC **electric** **field** between the adjacent elements, and oscillate therebetween as the relative polarities within the **array** reverse. At any instant, such electrons will be attracted to those elements 37 in the **array** which are instantaneously positive rather than to the conductive film 46 on the substrates which are electrically isolated from the **array**. In this way, heating of the moving substrates 32 due to the electron bombardment is essentially precluded without the necessity of providing wiping contacts to the **coated** film to negatively bias the substrates. As a result, it has been possible to eliminate film deterioration caused by such. . .

DETDESC:

DETD(17)

For any given pressure in the chamber 22, the use of the biased member 51 in conjunction with the AC-excited element **array** 36 has been found to increase the cathode current density during **sputtering** in direct proportion to the voltage of the bias supply source 53 up to bias voltages of several hundred volts. This phenomenon is similar to that obtained by relatively complex electromagnetic means in the so-called triode **sputtering** method, wherein a thermionic cathode and an independent anode are employed to establish the ionizing discharge. While the explanation of. . . believed that, in the context of the present arrangement, the distorting effect of the biased member 51 on the AC **electric** **fields** established within the **array** 36 increases the ionization concentration of the chamber gas in the region of the **array** plane. Typical variations in cathode current of the **array** 36 as a function of the magnitude of the positive or negative bias on the member 51 (with the effective. . . apparatus. For example, the influence of cathode tube diameter, the spacing between adjacent tubes and the spacing between the bias **plate** and the tubes are among the variables in the apparatus which may influence the cathode current amplification effect.

CLAIMS:

CLMS(1)

1. In an apparatus for **sputtering** a conductive **coating** on a substrate situated in an enclosed **sputtering** chamber:
a composite **sputtering** target comprising a plurality of parallel mutually spaced elongated elements arrayed symmetrically with respect to the substrate within the **sputtering** chamber and formed from the **coating** material to be **sputtered**;
means for applying opposite polarities of an AC voltage to adjacent ones of the elements in the **array** to establish an oscillating **electric** **field** between the adjacent elements;
an auxiliary conductive member disposed in spaced relation to the **array** for altering the oscillating **electric** **field** when a biasing voltage is applied to the member; and

CLAIMS:

CLMS(10)

10. A method of **sputtering** a conductive film on a substrate from a plurality of pairs of parallel, mutually spaced conductive elements that are arrayed symmetrically with respect to the substrate within an enclosed **sputtering** chamber and are made from the material to be **sputtered**, the steps comprising:
applying an AC **sputtering** voltage of opposite polarities between the elements in each pair of sufficient magnitude for establishing a current density in each element to **sputter** material on the substrate from the instantaneously negative element of each pair at a prescribed rate for **sputtering** and for establishing an oscillating **electric** **field** between the elements in each pair to prevent bombardment of the substrate by any free electrons within the field; and
distorting the oscillating **electric** **field** in the region between the elements by applying a D[redacted]s voltage to a conductive **plate** disposed parallel and in spac[redacted]ation to the **array** to increase the current

5. 3,968,018, Jul. 6, 1976, Sputter coating method; George C. Lane, et al., **204/192.3**, **192.12**, 298.25 [IMAGE AVAILABLE]

US PAT NO: 3,968,018 [IMAGE AVAILABLE] L9: 5 of 27

ABSTRACT:

An apparatus and method for sequentially cleaning and coating articles. The apparatus is in the form of a multi-chamber device, with each chamber being partially defined by valve units which permit passage of articles to be coated therethrough. Each chamber has associated therewith means for drawing a vacuum therein, several chambers include means for leaking a minute quantity of an inert but ionizable gas therein, and at least one chamber further includes at least one electrode, which may be placed in electrical communication with the articles so as to establish, in one of several ways, a direct current bias on the article with respect to another point within the chamber. Coating material to be transferred to the article is placed on one electrode, preferably in the form of a flat plate, in those chambers in which coating is to take place, whereas target material is not present in the cleaning or other non-coating chambers. One chamber is provided to serve as an air lock so that articles may be removed from it into the air while the chamber is sealed off from an adjacent chamber so as to prevent atmospheric contamination of coating material or articles to be coated in a coating chamber. Means are provided for moving articles successively from one chamber to another so that the articles may be introduced into one chamber, cleaned, coated by passage into one or more succeeding chambers, and then removed through a last, vacuum or air lock chamber. Cleaning occurs by reverse sputtering, sputter etching, or glow discharge, and coating occurs by diode sputtering of a target material from a target electrode onto the substrate or article to be coated.

US-CL-CURRENT: **204/192.3**, **192.12**, 298.25

DETDESC:

DETD(11)

Referring now to chamber 14, ramps 114, 116 are provided as are rollers 118 for receiving another holder 120 for another **array** of articles 122, the holder 120 containing, in the operation of the process, a previously inserted group of articles 122.. . . in an oppositely facing relation to the upper margins or edge surfaces 126 of the articles 122 is a target **plate** 128 overlying and being in direct electrical connection with an electrode **plate** 130, which includes cooling means in the form of a plurality of tubes 132 attached thereto for the passage of a coolant such as water therethrough. A radio frequency alternating **electrical** **potential** is supplied to the electrode 130 and to the target 128 associated therewith, through the line 134 which is connected. . .

CLAIMS:

CLMS(1)

We claim:

1. A method of batch cleaning and batch **coating** one **array** of articles with a thin **coating** material while maintaining said one **array** substantially free from contamination, said method comprising the steps of:
a. disposing said one **array** within a first evacuable region;
b. establishing a predetermined high vacuum in said first evacuable region;
c. establishing a high **electrical** **potential** between said one **array** and an electrode;
d. introducing a minute quantity of an ionizable inert gas into said first region and thus increasing the pressure therein whereby said one **array** will have at least portions of the surface thereof cleaned by bombardment with ions of said gas attracted to said. . . communication between said first region and a second evacuable region having said predetermined high vacuum established therein;
g. moving said one **array** at said predetermined high vacuum into said second region;
h. then isolating said second region from said first region;
i. establishing a high **electrical** **potential** between said one **array** and a target in said second region having a **coating** of material to be applied to said one **array**;
j. introducing a controlled quantity of an inert gas into said second region whereby said inert gas increases the pressure therein. . .

when ionized in the presence of said high potential, cau[illegible]ansfer of said material from said target to said one **array**;
k. thereafter reestablishing said predetermined high vacuum in said second region;
l. providing spacial communication between said second region and a third evacuable region having said predetermined high vacuum established therein;
m. moving said one **array** at said predetermined high vacuum to said third region; and
n. isolating said third region from said second region.

CLAIMS:

CLMS(2)

2. The method of claim 1 further comprising the steps of:
o. establishing a high **electrical** **potential** between said one **array** and another target in said third region having another **coating** of material to be applied to said one **array**;
p. introducing a controlled quantity of an inert gas into said third region whereby said inert gas increases the pressure therein. . . ionized in the presence of said high potential, causes transfer of said material from said another target to said one **array**;
q. thereafter reestablishing said predetermined high vacuum in said third region;
r. providing spacial communication between said third region and a fourth evacuable region having said predetermined high vacuum established therein;
s. moving said one **array** at said predetermined high vacuum to said fourth region; and
t. isolating said fourth region from said third region.

CLAIMS:

CLMS(7)

7. A method of batch cleaning and batch **coating** an **array** of articles with a thin **coating** material while maintaining said **array** substantially free from contamination, said method comprising the steps of disposing said **array** within a first evacuable region; establishing a predetermined high vacuum in said first evacuable region; establishing a high **electrical** **potential** between said **array** and a surrounding surface; introducing a minute quantity of an ionizable inert gas into said first region and thus increasing the pressure therein whereby said **array** will have at least portions of the surfaces thereof cleaned by bombardment with ions of said gas attracted to said. . . spacial communication between said first region and a second evacuable region having said predetermined high vacuum established therein; moving said **array** at said predetermined high vacuum into said second region; then isolating said second region from said first region; establishing a high **electrical** **potential** between said **array** and a target in said second region having a **coating** of material to be applied to said **array**; introducing a controlled quantity of an inert gas into said second region whereby said inert gas increases the pressure therein. . . and, when ionized in the presence of said high potential, causes transfer of said material from said target to said **array**; thereafter reestablishing said predetermined high vacuum in said second region; providing spacial communication between said second region and a third evacuable region having said predetermined high vacuum established therein; moving said **array** at said predetermined high vacuum to said third region; and isolating said third region from said second region.

CLAIMS:

CLMS(8)

8. The method of claim 7 further comprising the steps of establishing a high **electrical** **potential** between said **array** and another target in said third region having another **coating** of material to be applied to said **array**; introducing a controlled quantity of an inert gas into said third region whereby said inert gas increases the pressure therein. . . when ionized in the presence of said high potential, causes transfer of said material from said another target to said **array**; thereafter reestablishing said predetermined high vacuum in said third region; providing spacial communication between said third region and a fourth evacuable region having said predetermined high vacuum established therein; moving said **array** at said predetermined high vacuum to said fourth region; and isolating said fourth region from said third region.

6. 5,518,597, May 21, 1996, Cathodic arc coating apparatus and method; Jonathan G. Storer, et al., *[illegible]92.38**, 298.41; 427/580 [IMAGE AVAILABLE]

US PAT NO: 5,518,597 [IMAGE AVAILABLE] L9: 6 of 27

ABSTRACT:
A cathodic arc coating apparatus for applying a coating to an object is provided. The apparatus includes: an enclosure; means for evacuating the enclosure; an anode within the enclosure, wherein the anode comprises an open array of a metal defining a central axis and a deposition space for positioning the object; a cathode assembly positioned within the deposition space, wherein the cathode assembly comprises a first consumable cathode having a central axis and an evaporation surface; means for generating a plasma stream comprising charged particles, wherein the plasma stream is projected from the evaporation surface of the first consumable cathode toward the anode array; and a magnetic system for diverting the charged particles of the plasma stream away from the anode array and toward the object being coated; wherein the diverted charged particles are deposited on the object to form a coating thereon.
US-CL-CURRENT: **204/192.38**, 298.41; 427/580

DETDESC:

DETD(5)

In all embodiments of the cathodic arc **coating** apparatus of the present invention, the cathode evaporation surface, from which the plasma stream is projected, is placed out of the line-of-sight of the object to be **coated**. The magnetic field and its concomitant **electric** **field** turn a substantial fraction of the plasma stream toward the object to be **coated**, and the macroparticles fly off in a harmless direction. In certain preferred embodiments, a substantial amount of the fraction of the plasma stream that is not turned toward the object to be **coated** passes out through the open anode **array**. This includes the macroparticles. Because the anode **array** is heated, which is preferred when a nonconductive **coating** is being produced, that portion of the plasma stream that lands on the anode **array** is not as detrimental to the generation of the plasma as when the anode **array** is not heated. That is, as a result of heating the anode **array** during the deposition of a nonconductive **coating**, the apparatus can run for hours (or until the cathode material is consumed), as opposed to only about 7-10 minutes,. . . to place the anode and the cathode a sufficient distance apart to reduce the deposition of macroparticles on the anode **array** itself, while at the same time it is desirable to place them dose together to provide as strong an **electric** **field** as possible to deflect the charged particles of the plasma stream to the object being **coated**.

DETDESC:

DETD(19)

For the preferred anode **array**, a sufficient number of wires are used to set up an **electric** **field** and direct the charged particles to the object to be **coated**. It is generally desirable to use as few wires as possible to provide as open an **array** as possible; however, the greater the number of wires, the greater the steering capacity of the wires and the more uniform the deposited **coating**. Depending on the size of the anode **array**, the desired strength of the **electric** **field** to be generated, and the desired amount of current to be applied, a wide number of anode wires can be used. Preferably, these anode wires are axially aligned and spaced generally equidistant in a circular cross-sectional **array**. More preferably, the anode wires are spaced equidistant from each other and from the cathode. Typically, the size of the **array**, e.g., the cross-sectional diameter of the tube defined by the **array** of wires, and the axial length of the wires are limited only by practical considerations, such as the size of. . .

DETDESC:

DETD(31)

Referring to FIG. 6, for **coating** fibers with a metal oxide **coating**, the apparatus operates in the following manner: pay-out spools 21 containing fibers 19 are placed in the upper chamber 1. . . of the cathode and formation of a plasma cloud rotating in a plane perpendicular to the axis of the anode **array**. As a result, the neutral macroparticles of the plasma stream pass through the openings between the anode wires and the positive ions are deflected from the potential barrier produced by the **electric** **field** in the plasma under the influence of the magnetic field and deposit on the surface of the object being **coated**. Due to the rotation of the plasma cloud, the

object is **coated** throughout the whole periphery ther[illegible]

7. 4,812,217, Mar. 14, 1989, Method and apparatus for feeding and coating articles in a controlled atmosphere; Carroll H. George, et al., **204/192.12**; 118/718, 724; 204/298.09, 298.16, 298.25 [IMAGE AVAILABLE]

US PAT NO: 4,812,217 [IMAGE AVAILABLE] L9: 7 of 27

ABSTRACT:
A process and apparatus for cleaning then coating articles such as circuit board panels with a metallic coating encompasses an enclosed evacuated chamber having a controlled low pressure gaseous process environment. The articles to be cleaned, then coated with a metallic deposit are continuously fed into the enclosed chamber through an air lock mechanism that permits the evacuated chamber to remain at its predetermined pressure and gaseous composition. Included within the chamber are a plurality of transport paths or panel carrying tracks. The articles to be cleaned, then coated are continuously transported along the various tracks while being coated.
The plurality of tracks are positioned to be substantially parallel with each other so that articles on each track follow paths similar in direction and substantially equidistant from one another. A plurality of bidirectional coating sources are sequentially positioned on both sides of each article transport track so that both sides of the panels are coated.
US-CL-CURRENT: **204/192.12**; 118/718, 724; 204/298.09, 298.16, 298.25

CLAIMS:

CLMS(19)

19. A processing system for depositing a metallic **coating** on an article, comprising:
an airtight processing chamber and means adapted for providing a low pressure controlled gaseous atmosphere within the airtight processing chamber,
first, second and third serial **arrays** of **coating** sources for supplying the metallic **coating** to be deposited on the articles, the first, second and third serial **arrays** being substantially parallel to one another,
each **coating** source including a magnetic field source, an **electric** **field** source, and first and second planar targets of a desired **coating** material arranged to supply **coating** particles in substantially opposing directions that are substantially perpendicular to the first, second and third serial **arrays** and further including an additional magnetic field source associated with each **coating** source to cooperate with the magnetic field source to constrain magnetic flux adjacent a surface of an article being **coated** to be parallel to the surface of an article being **coated**,
first and second article transport tracks substantially parallel to the first, second and third serial **arrays**, the first article transport track located intermediate to the first and second serial **arrays** and the second article transport track located intermediate to the second and third serial **arrays**, the article transport tracks being operative for guiding articles to be **coated** through the airtight processing chamber,
and means for continuously inserting and continuously removing articles into and out of the airtight processing. . .

CLAIMS:

CLMS(20)

20. A processing system as defined in claim 19 wherein at least the first and second serial **arrays** each include a source of electrically neutral atoms for **sputter** cleaning an adjacent side of an article on an adjacent transport track, each source of electrically neutral atoms including a magnetic field source, an **electric** **field** source and first and second opposing planar targets, first and second screens between the first and second planar targets and adjacent transport tracks, the first and second screens being at a cathodic **electrical** **potential** that electrically neutralizes all **sputtered** particles passing through it.

8. 5,282,944, Feb. 1, 1994, Ion source based on the cathodic arc; David M. Sanders, et al., **204/192.38**, 298.41; 250/426; 313/153, 157; 427/580 [IMAGE AVAILABLE]

US PAT NO: 5,282,944 [IMAGE AVAILABLE] L9: 8 of 27

ABSTRACT:
A cylindrically symmetric ar[illegible]rce to produce a ring of ions which leave the surface of the arc target radially and are reflected by electrostatic fields present in the source to a point of use, such as a part to be **coated**. An **array** of electrically isolated rings positioned in the source serves the dual purpose of minimizing bouncing of macroparticles and providing electrical insulation to maximize the **electric** **field** gradients within the source. The source also includes a series of baffles which function as a filtering or trapping mechanism for any macroparticles.
US-CL-CURRENT: **204/192.38**, 298.41; 250/426; 313/153, 157; 427/580

ABSTRACT:
A . . . are reflected by electrostatic fields present in the source to a point of use, such as a part to be **coated**. An **array** of electrically isolated rings positioned in the source serves the dual purpose of minimizing bouncing of macroparticles and providing electrical insulation to maximize the **electric** **field** gradients within the source. The source also includes a series of baffles which function as a filtering or trapping mechanism. . .

SUMMARY:

BSUM(17)

The present invention involves a cathodic arc for producing dense, adherent **coatings**, which uses a cylindrically symmetric arc source to produce a ring of ions which leave the surface of an arc. . . in space determines in large part the overall efficiency of the source. The arc source of this invention utilizes an **array** of electrically isolated rings which serves the dual purpose of minimizing bouncing of macroparticles and providing electrical insulation to maximize the **electric** **field** gradients within the source. In addition, the ion source utilizes a series of baffles for trapping and/or minimizing bouncing of. . .

DETDESC:

DETD(10)

The **array** or plurality of insulating rings 21 serves the dual purpose of filtering or minimizing bouncing of macroparticles produced from target 17 and providing electrical insulation to maximize the **electric** **field** gradients within the source, which in turn, maximizes source efficiency. The flow of electrons through the macroparticle filter produces the. . . creates the electrostatic fields that guide the ions out of the source and onto substrate or part 12 to be **coated**.

9. 4,264,393, Apr. 28, 1981, Reactor apparatus for plasma etching or deposition; Georges J. Gorin, et al., 156/345; 118/620, 728; **204/192.32**, 298.33, 298.39; 216/67; 422/186.29, 906 [IMAGE AVAILABLE]

US PAT NO: 4,264,393 [IMAGE AVAILABLE] L9: 9 of 27

ABSTRACT:
Plasma reactor apparatus which provides improved uniformity of etching or deposition. A uniform radio frequency (RF) field is established between two closely spaced parallel plates disposed within the reactor. One of the plates functions as a manifold for the reactant gases, mixing the gases and dispensing them through a regular array of orifices into the RF field between the plates. The uniformity results from a combination of the uniform field, the uniform dispersion of reactant gases, and the close proximity of the gas dispersal to the work pieces. The capacity of the apparatus can be increased by repeating the parallel plate structure in a stacked array of alternating grounded and RF energized plates.
US-CL-CURRENT: 156/345; 118/620, 728; **204/192.32**, 298.33, 298.39; 216/67; 422/186.29, 906

DETDESC:

DETD(2)

In. . . reactor enclosure 10 is shown within which the ambient can be controlled. Disposed within the enclosure 10 are two metallic **plates** 12, 14 which are arranged parallel to each other and separated by a small distance. The lower **plate** 12 is electrically grounded. The upper **plate** 14 is connected to a source of RF energy 16 which can be any conventional RF generator. The two **plates** 12, 14 can thus form part of the RF generator circuit. A sheet or holder 18 is provided to hold. . . example, semiconductor wafers. The work pieces 20 could also be, for example, lenses, precision mechanical parts, or the like. The

plates 12, 14 are metallic and can be made, for exam[illegible] aluminum or other suitable metal. The spacing between the **plates[illegible] be from about one-half inch to about two inches. The area of the **plates** 12, 14 is somewhat arbitrary and can be made as large as necessary to accommodate the required size of the work piece or the desired number of smaller work pieces. The length and width of the **plates** 12, 14 should be large compared to the spacing between the **plates** to assure a uniform RF **electric** **field** over most of the area of the **plates**. A **plate** size of twelve inches by twelve inches has been found to be satisfactory but the ultimate size is a matter of design choice to accomplish the specific task. The upper **plate** 14 is hollowed out to form a cavity 22. Obviously it would also be possible to form the cavity, for. . . into the cavity. Once the gases are mixed, they are dispersed from the cavity 22 through orifices 30. Thus, the **plate** 14 forms one element of the RF generator circuit while additionally serving as a gas manifold. The orifices 30 can be a regular rectangular **array** of holes formed in the bottom of the upper **plate** 14. The holes can be spaced at about one-half inch intervals in both length and width dimension. Such a regular **array** of orifices helps to insure a uniform distribution of gases throughout the space between the two parallel **plates** 12, 14 and around each of the work pieces 20.

10. 5,496,455, Mar. 5, 1996, Sputtering using a plasma-shaping magnet ring; Michael Dill, et al., **204/192.12**, 298.16, 298.17, 298.19, 298.2, 298.22 [IMAGE AVAILABLE]

US PAT NO: 5,496,455 [IMAGE AVAILABLE] L9: 10 of 27

ABSTRACT:
Sputtering apparatus and method employing an auxiliary magnetic structure situated between the substrate holder and target of a plasma sputtering chamber to control-the lateral extent of the plasma. The auxiliary magnetic structure, possessing a lower field strength in the plasma region than the principal magnet or magnets, is situated immediately outside of and around a circumference of the chamber's anode shield. The principal magnets maintain the plasma in a ring adjacent to the sputtering target. The auxiliary magnetic structure causes the plasma ring to expand toward the edge of the target or contract away from the edge depending on the magnetic strength and polarity of the structure and its position relative to the target.
US-CL-CURRENT: **204/192.12**, 298.16, 298.17, 298.19, 298.2, 298.22

DETDESC:

DETD(6)

FIG. 2 shows an exemplary **sputtering** apparatus of the invention for **sputtering** material from a target 4 onto a substrate 6 supported by a substrate holder 5. The material is **sputtered** from the inner surface 7 of the target 4 when a plasma discharge is formed in the chamber 16, in the **sputtering** region 9. The substantial circular chamber 16 is depicted as a DC **sputtering** apparatus in which the plasma is formed in the chamber 16, which can be evacuated and filled with a low. . . a negative DC bias from a power supply 8 to the target. The relationship between the required bias voltage and **sputtering** gas pressure within the **sputtering** region 9 is well known in the art. The apparatus also includes an anode shield 10 which serves to maintain the required **electric** **field** in the **sputtering** region 9 and the auxiliary magnetic structure 11 of the invention. The auxiliary magnetic structure 11 may be fixed to. . . shield 10 or movably engaging the anode shield 10. The auxiliary magnetic structure 11, for example, may consist of an **array** of permanent magnets 12 affixed to a band 13 of soft magnetic material. The magnets 12 need to be near. . .

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(FILE 'USPAT' ENTERED AT 14:44:41 ON 11 NOV 1998)
L1 187352 S ARRAY OR ARRAYS
L2 79502 S ELECTRIC? (2W) (FIELD# OR POTENTIAL#)
L3 1121597 S SPUTTER? OR COAT#### OR PLAT#### OR ELECTROPLAT#### OR SHA
L4 20 S L1 (5A) L2 (5A) L3
L5 4607 S 204/192.!?/CLS
L6 0 S L5 AND L4
L7 27 S L5 AND L1 (P) L2 (P) L3
L8 0 S L5 AND L1 (5A) L2 (5A) L3
L9 27 FOCUS L7 1-

=> s 204/clas

L10 37567 204/CLAS

=> s l4 and l10

L11 5 L4 AND L10

=> d 1-5

1. 5,810,988, Sep. 22, 1998, Apparatus and method for generation of microspheres of metals and other materials; Charles Vincent Smith, Jr., et al., **204/666**; 239/4, 102.2, 135; 347/1 [IMAGE AVAILABLE]

2. 4,541,910, Sep. 17, 1985, Method for electroblotting macromolecules from a chromatographic gel; Fred E. Davis, III, et al., **204/464**, **456** [IMAGE AVAILABLE]

3. 4,469,582, Sep. 4, 1984, Electrically enhanced inclined plate separator; Kerry L. Sublette, et al., **204/666**, **673**; 210/521 [IMAGE AVAILABLE]

4. 4,001,102, Jan. 4, 1977, Process for generating periodic non-uniform electric field, and for removing polarizable particulate material from fluid, using ferroelectric apparatus; Howard D. Batha, et al., **204/547**, **571**; 435/173.9 [IMAGE AVAILABLE]

5. 3,930,982, Jan. 6, 1976, Ferroelectric apparatus for dielectrophoresis particle extraction; Howard D. Batha, et al., **204/660**, **665**, **672**, **674** [IMAGE AVAILABLE]

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PROCESSING COMPLETED FOR L11
L12 5 FOCUS L11 1-

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1. 5,810,988, Sep. 22, 1998, Apparatus and method for generation of microspheres of metals and other materials; Charles Vincent Smith, Jr., et al., **204/666**; 239/4, 102.2, 135; 347/1 [IMAGE AVAILABLE]

US PAT NO: 5,810,988 [IMAGE AVAILABLE] L12: 1 of 5

ABSTRACT:
Apparatus and methods for making uniformly-sized and predictably-spaced droplets or solid microspheres from high-temperature or other liquids. Liquid droplet generators having electromechanical driving elements are coupled to a power supply to apply pulsed excitation forces through a wall of a delivery tube to a liquid, e.g., a liquid metal, epoxy, or polymer. The excitation forces generated by the driver induce capillary vibrations in the liquid within the delivery tube, which breaks the stream into substantially uniformly-sized liquid droplets shortly after leaving the orifice. Droplets may be produced in a uniformly-spaced series, or individually on demand in response to a single burst of force from the driving element. If solid microspheres are desired, the trajectory of the emitted droplets is determined to permit the solidification prior to catching or collecting the microspheres. Solidification of the spherical drops may be accomplished by freezing, evaporation, or chemical reaction due to heat transfer, material transfer, or chemical reaction as the droplets traverse a controlled environment chamber. To permit collection of the microspheres with controlled material properties and without deforming or otherwise changing either the sphericity or surface quality, the flight path environment is controlled to bring the drops to a very low speed prior to collection of the solidified microspheres.
US-CL-CURRENT: **204/666**; 239/4, 102.2, 135; 347/1

SUMMARY:

BSUM(50)

In. . . plates. The charged liquid droplets are solidified in flight into solid charged microspheres. The microsphere transport system comprises a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers, and a plurality of positive and a plurality of negative electrodes. . .

DETDESC:

DETD(62)

FIG. . . . the stacked bar array used to create an electronically stabilized portion of an electrostatic "traveling wave" electric field. The stacked **array** is comprised of equally-spaced **electric** **field** electrode **plates** 1601 disposed between electric insulation spacers 1602 to provide an assembly of alternating electric field electrode plates 1601 (three are. . .

CLAIMS:

CLMS(4)

4. The apparatus of claim 2, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

CLAIMS:

CLMS(16)

16. The apparatus of claim 12, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

CLAIMS:

CLMS(23)

23. The apparatus of claim 22, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

CLAIMS:

CLMS(29)

29. The apparatus of claim 28, wherein said microsphere transport system comprises:
a stacked **array** comprising a plurality of **electric** **field** electrode **plates** disposed in an alternating arrangement between electric insulation spacers;
a plurality of positive and a plurality of negative electrodes disposed within. . .

2. 4,469,582, Sep. 4, 1984, Electrically enhanced inclined plate separator; Kerry L. Sublette, et al., **204/666**, **673**; 210/521 [IMAGE AVAILABLE]

US PAT NO: 4,469,582 [IMAGE AVAILABLE] L12: 2 of 5

ABSTRACT:
The shell of a cylindrical vessel, horizontally extended, contains three compartments through which emulsions of polar and non-polar liquids are sequentially passed for separation. The heating and the electric field in the first two compartments are optional. The third compartment contains an inclined plate separator connected to an electrical system to generate electric fields within the passages of the separator to coalesce and separate the polar liquid from the non-polar liquid.
US-CL-CURRENT: **204/666**, **673**; 210/521

DETDESC:

DETD(25)

The parallel **plates** 22, 22' of **array** 21 provide a homogeneous **electric** **field** of constant strength at the entrance of their passageway, followed by a degrading portion of the field. Note that the. . .

CLAIMS:

CLMS(1)

We. . .
passageways provided between the plates of the array;
and an electrical source connected to the electrically conductive first section of each **plate** of the **array** to generate an **electric** **field** in each passageway formed between the plates of the array;
whereby the liquid mixture is first exposed to the electric field. . .

3. 3,930,982, Jan. 6, 1976, Ferroelectric apparatus for dielectrophoresis particle extraction; Howard D. Batha, et al., **204/660**, **665**, **672**, **674** [IMAGE AVAILABLE]

US PAT NO: 3,930,982 [IMAGE AVAILABLE] L12: 3 of 5

ABSTRACT:
Polarizable particulate material, such as organic and inorganic colloidal particles such as small pieces of metal, oxides and the like, zwitterionic molecules, and even living organisms and viruses can be preferentially removed from a liquid by dielectrophoresis, by passing the liquid containing the polarizable particulate material to be removed over a ferroelectric apparatus which generates a periodic non-uniform electric field near the boundary between alternately polarized portions of the ferroelectric material. The periodic non-uniform electric field is generated by subjecting portions of the ferroelectric material to an alternating potential to alternately polarize the portions, while allowing other portions of the ferroelectric material to remain polarized in the same direction.
US-CL-CURRENT: **204/660**, **665**, **672**, **674**

DETDESC:

DETD(39)

Other. . . may have advantages in situation in which a number of parallel plates of ferroelectric material 21 are arranged in close **array**, so that the overlapping **electric** **fields** from adjacent **plates** can be correlated in their directions. In FIG. 15, as in FIG. 16, the portions of the ferroelectric material whose. . .

4. 4,541,910, Sep. 17, 1985, Method for electroblotting macromolecules from a chromatographic gel; Fred E. Davis, III, et al., **204/464**, **456** [IMAGE AVAILABLE]

US PAT NO: 4,541,910 [IMAGE AVAILABLE] L12: 4 of 5

ABSTRACT:
An improved method of electroblotting macromolecules from a chromatographic gel is claimed. The method comprises a design for wire electrode arrays that are capable of generating either highly uniform or controlled predetermined gradient electric fields. A gradient electric field is particularly suited for the quantitative electroblotting of proteins with a wide range of molecular weights.
US-CL-CURRENT: **204/464**, **456**

DETDESC:

DETD(2)

One. . . generate predictably uniform electric fields, i.e., fields without undesirable detectable changes in field intensity. The standard procedure employed to produce **electric** **fields** has been to use an **array** of **platinum** wire as the electrode. In practice, arrays of various configurations have been employed. The goal in routing the platinum wires. . .

5. 4,001,102, Jan. 4, 1977, Process for generating periodic non-uniform electric field, and for removing polarizable particulate material from fluid, using ferroelectric apparatus; Howard D. Batha, et al., **204/547**, **571**; 435/173.9 [IMAGE AVAILABLE]

US PAT NO: 4,001,102 [IMAGE AVAILABLE] L12: 5 of 5

ABSTRACT:
Polarizable particulate material, such as organic and inorganic colloidal particles such as small pieces of metal, oxides and the like, zwitterionic molecules, and even living organisms and viruses can be preferentially removed from a liquid by dielectrophoresis, by passing the liquid containing the polarizable particulate material to be removed over a ferroelectric apparatus which generates a periodic non-uniform electric

field near the boundary between alternately polarized por[illegible]f the ferroelectric material. The periodic non-uniform electric fi[illegible]s generated by subjecting portions of the ferroelectric material to an alternating potential to alternately polarize the portions, while allowing other portions of the ferroelectric material to remain polarized in the same direction.
US-CL-CURRENT: **204/547**, **571**; 435/173.9

DETDESC:

DETD(39)

Other . . . may have advantages in situations in which a number of parallel plates of ferroelectric material 21 are arranged in close **array**, so that the overlapping **electric** **fields** from adjacent **plates** can be correlated in their directions. In FIG. 15, as in FIG. 16, the portions of the ferroelectric material whose. . .

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L2       79502 S ELECTRIC? (2W) (FIELD# OR POTENTIAL#)
L3     1121597 S SPUTTER? OR  COAT#### OR PLAT#### OR
ELECTROPLAT#### OR
SHA
L4          20 S L1 (5A) L2 (5A) L3
L5        4607 S 204/192.!?/CLS
L6           0 S L5 AND L4
L7          27 S L5 AND L1 (P) L2 (P) L3
L8           0 S L5 AND L1 (5A) L2 (5A) L3
L9          27 FOCUS L7 1-
L10      37567 S 204/CLAS
L11          5 S L4 AND L10
L12          5 FOCUS L11 1-
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ALL L# QUERIES AND ANSWER SETS ARE DELETED AT LOGOFF
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U.S. Patent & Trademark Office LOGOFF AT 15:17:23 ON 11 NOV 1998

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Trying 9158046...Open

DIALOG INFORMATION SERVICES
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Status: Signing onto Dialog
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ENTER PASSWORD:
******** HHHHHHHH SSSSSSSS? ********
Welcome to DIALOG
Status: Connected

Dialog level 98.09.24D

Last logoff: 09nov98 11:42:16
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ANNOUNCEMENT **** ANNOUNCEMENT **** ANNOUNCEMENT
NEW
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***CorpTech (File 559)
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***BIOSIS Previews (File 5,55)
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>>> of new databases, price changes, etc. <<<
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File 411:DIALINDEX(R)

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You have 182 files in your file list.
(To see banners, use SHOW FILES command)
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8 16: IAC PROMT(R)_1972-1998/Nov 11
2 18: IAC F&S INDEX(R)_1980-1998/Nov 10
4 32: METADEX(R)_1966-1998/Dec B2
4 34: SciSearch(R) Cited Ref Sci_1990-1998/Nov W1
1 35: Dissertation Abstracts Online_1861-1998/Nov
2 94: JICST-EPlus_1985-1998/Aug W4
3 99: Wilson Appl. Sci & Tech Abs_1983-1998/Sep
17 103: Energy SciTec_1974-1998/Oct B1
16 108: Aerospace Database_1962-1998/Nov
73 144: Pascal_1973-1998/Oct
8 148: IAC Trade & Industry Database_1976-1998/Nov 11
Examined 50 files
1 192: Industry Trends & Anal._1997/Jun
1 238: Abs. in New Tech & Eng._1981-1998/Oct
2 240: PAPERCHEM_1967-1998/Jul W3
1 248: PIRA_1975-1998Jan W2
1 317: Chemical Safety NewsBase_1981-1998/Nov
4 335: Ceramic Abstracts_1976-1998/Q3
247 340: CLAIMS(R)/US Patent_1950-98/Nov 03
1 344: Chinese Patents ABS_Apr 1985-1998/Sep
10 345: INPADOC/FAM.& LEGAL STAT._1998/9843/44
72 347: JAPIO_Oct 1976-1998/Jul.(UPDATED 981030)
110 348: European Patents_1978-1998/Nov W45
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1 354: APILIT(R)_1965-1998/Nov W2
Examined 100 files
1 434: SciSearch(R) Cited Ref Sci_1974-1989/Dec
2 624: McGraw-Hill Publications_1985-1998/Nov 06
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116 652: US Patents Fulltext_1971-1979
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142 653: US Pat.Fulltext_1980-1989
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Processing
253 654: US Pat.Full._1990-1998/Nov 03
6 763: Freedonia Market Res._1990-1998/Oct
2 764: BCC Market Research_1989-1998/Nov
2 15: ABI/INFORM(R)_1971-1998/Nov 11
26 62: SPIN(R)_1975-1998/Nov W2
1 77: Conference Papers Index_1973-1998/Nov
Examined 150 files
2 109: Nuclear Sci. Abs._1948-1976
1 239: Mathsci(R)_1940-1998/Nov
1 587: Jane's Defense&Aerospace_1998/Oct W4
3 636: IAC Newsletter DB(TM)_1987-1998/Nov 11
1 647: CMP Computer Fulltext_1988-1998/Oct W3

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(ELECTRI? OR POTENTIAL? ?))

Ref	Items	File
N1	253	654: US Pat.Full._1990-1998/Nov 03
N2	247	340: CLAIMS(R)/US Patent_1950-98/Nov 03
N3	179	351: DERWENT WPI_1963-1998/UD=9845;UP=9842;UM=9840
N4	142	653: US Pat.Fulltext_1980-1989
N5	116	652: US Patents Fulltext_1971-1979
N6	110	348: European Patents_1978-1998/Nov W45
N7	73	144: Pascal_1973-1998/Oct
N8	72	347: JAPIO_Oct 1976-1998/Jul.(UPDATED 981030)
N9	54	6: NTIS_64-1998/Dec W1
N10	43	8: Ei Compendex(R)_1970-1998/Nov W5

43 files have one or more items; file list includes 182 files.

- Enter P or PAGE for more -

?p

Your last SELECT statement was:

S ((ARRAY? ? OR SEMICONDUCTOR? ?) (3N) (PLAT???? OR ELECTROPLAT?) (3N) (ELECTRI? OR POTENTIAL? ?))

Ref	Items	File
N11	28	2: INSPEC_1969-1998/Nov W3
N12	26	62: SPIN(R)_1975-1998/Nov W2
N13	17	103: Energy SciTec_1974-1998/Oct B1
N14	16	108: Aerospace Database_1962-1998/Nov
N15	10	345: INPADOC/FAM.& LEGAL STAT._1998/9843/44
N16	8	16: IAC PROMT(R)_1972-1998/Nov 11
N17	8	148: IAC Trade & Industry Database_1976-1998/Nov 11
N18	6	763: Freedonia Market Res._1990-1998/Oct
N19	4	32: METADEX(R)_1966-1998/Dec B2
N20	4	34: SciSearch(R) Cited Ref Sci_1990-1998/Nov W1

43 files have one or more items; file list includes 182 files.

- Enter P or PAGE for more -

?begin n11 and n19 and n20
>>>"AND" is invalid in a filelist.
>>>Invalid BEGIN command
?begin n11, n19, n20
11nov98 15:54:53 User233832 Session D156.2
$12.31 9.848 DialUnits File411
$12.31 Estimated cost File411
FTSNET 0.316 Hrs.
$12.31 Estimated cost this search
$12.49 Estimated total session cost 9.902 DialUnits

SYSTEM:OS - DIALOG OneSearch
File 2:INSPEC 1969-1998/Nov W3
(c) 1998 Institution of Electrical Engineers
File 32:METADEX(R) 1966-1998/Dec B2
(c) 1998 Cambridge Scientific Abs
File 34:SciSearch(R) Cited Ref Sci 1990-1998/Nov W1
(c) 1998 Inst for Sci Info

Set	Items	Description

?exs
Executing TDCOAT
>>>SET HILIGHT: use ON, OFF, or 1-5 characters
174141 ARRAY? ?
562348 SEMICONDUCTOR? ?
421278 PLAT????
16849 ELECTROPLAT?
836008 ELECTRI?
753959 POTENTIAL? ?
S1 36 ((ARRAY? ? OR SEMICONDUCTOR? ?) (3N) (PLAT???? OR ELECTROPLAT?) (3N) (ELECTRI? OR POTENTIAL? ?))
?rd
...completed examining records
S2 33 RD (unique items)
?t s2/3,ab,k/1-3
>>>KWIC option is not available in file(s): 32

2/3,AB,K/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

4728317 INSPEC Abstract Number: A9418-7155-011
Title: Visualization of electrical inhomogeneities in high-ohmic semiconductor plates by an ionization-type photographic system
Author(s): Lebedeva, N.N.; Salamov, B.G.; Akinoglu, B.G.; Allakhverdiev, K.R.
Author Affiliation: State Un[illegible]aku, Azerbaijan
Journal: Journal of Physics D (Applied Physics) vol.27, no.6 p. 1229-32
Publication Date: 14 June 1994 Country of Publication: UK
CODEN: JPAPBE ISSN: 0022-3727
U.S. Copyright Clearance Center Code: 0022-3727/94/061229+04$19.50
Language: English
Abstract: A device for rapid visualization of electrical and spatial inhomogeneities of a semi-insulating GaAs (p>or=10/sup 6/ Omega cm) is described. This visualizer is a modification of the ionization type photographic system in which a semiconducting plate is placed between transparent plane parallel electrodes in the gas discharge cell. The gas discharge gaps are formed between free surfaces of the semiconductor and electrodes. When a voltage is applied to the electrodes a discharge luminescence glows in the gap under uniform infrared illumination of the semiconductor. The uniformity of glowing over the semiconductor area is determined by electrical homogeneity and infrared absorptivity of the material. The main discharge glow patterns on both sides and after chemical etching are similar, which reflects the fact that the structural defects are continuous within the plate. The observed patterns give information about EL2 centres in the GaAs semiconductor. Technical data of the ionization-type visualizer of electrical inhomogeneities in a semiconducting plate are given.

Title: Visualization of electrical inhomogeneities in high-ohmic semiconductor plates by an ionization-type photographic system

2/3,AB,K/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

4608042 INSPEC Abstract Number: B9404-8120J-006, C9404-7165-007
Title: 'GIS: a distribution solution'
Author(s): Verde, J.
Author Affiliation: UNION-FENOSA's SGD Project, Madrid, Spain
Conference Title: Proceedings AM/FM International Annual Conference XVI p.959-68
Publisher: AM/FM Int, Aurora, CO, USA
Publication Date: 1993 Country of Publication: USA xi+997 pp.
Conference Date: 22-25 March 1993 Conference Location: Orlando, FL, USA
Language: English
Abstract: This paper represents UNION-FENOSA's solution for the improvement of key aspects in the Electric Distribution Management by means of a GIS platform . The complexity of an electric array and its engineering implications are minimized here both in urban and rural areas, by making use of well defined and tailored computer applications. The GIS solution is completed with the addition of complementary modules such as SCADAS and and updated landbase which helps control the distribution task in remote areas as well as keeping track from a computerized central unit, of customer-reported incidences until they are finally solved in the least time.
Abstract: This paper represents UNION-FENOSA's solution for the improvement of key aspects in the Electric Distribution Management by means of a GIS platform . The complexity of an electric array and its engineering implications are minimized here both in urban and rural areas, by making...

2/3,AB,K/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC

03823305 INSPEC Abstract Number: B91017661, C91016116
Title: Progress towards the demonstration of a digital optical cellular logic image processor
Author(s): Wherrett, B.S.; Walker, A.C.; Smith, S.D.
Author Affiliation: Dept. of Phys., Heriot-Watt Univ., Edinburgh, UK
Journal: Proceedings of the SPIE - The International Society for Optical Engineering vol.1280 p.231-7
Publication Date: 1990 Country of Publication: USA
CODEN: PSISDG ISSN: 0277-786X
Conference Title: High-Speed Phenomena in Photonic Materials and Optical Bistability
Conference Sponsor: SPIE; EPS; EUROPTICA
Conference Date: 12-14 March 1990 Conference Location: The Hague, Netherlands
Language: English
Abstract: An all-optical processing loop circuit, pumped entirely by semiconductor diode lasers, has been constructed and operated. Functional

features include optically programmable logic, th[redacted]ding and synchronization; these are achieved using three bista[redacted]terference filter devices. The circuit is presently single-channel, however 15*15 capability of the devices has been demonstrated using Dammann holograms and array-to- array coupling of a pair of bistable plates ; potential parallelism is in excess of 10/sup 4/. Circuit tolerancing is also described.

...Abstract: 15*15 capability of the devices has been demonstrated using Dammann holograms and array-to- array coupling of a pair of bistable plates ; potential parallelism is in excess of 10/sup 4/. Circuit tolerancing is also described.
?ds

Set Items Description
S1 36 ((ARRAY? ? OR SEMICONDUCTOR? ?) (3N) (PLAT???? OR ELECTROP-
LAT?) (3N) (ELECTRI? OR POTENTIAL? ?))
S2 33 RD (unique items)
?s s2 and electroplat???
33 S2
16836 ELECTROPLAT???
S3 1 S2 AND ELECTROPLAT???
? d s3/3,ab,k/1
>>>KWIC option is not available in file(s): 32
Display 3/3,AB,K/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

03580356 INSPEC Abstract Number: B90020512
Title: Avoiding electrolytic and strain-induced shorting mechanisms-a review
Author(s): Hitch, T.T.
Author Affiliation: David Sarnoff Res. Center, Princeton, NJ, USA
Journal: Circuit World vol.16, no.2 p.41-4
Publication Date: 1990 Country of Publication: UK
CODEN: CIWODV ISSN: 0305-6120
Language: English
Abstract: Electrolytic or electrochemical shorting is an electrical field-induced mechanism that can destroy the integrity of modern, densely packed circuits operated in the presence of moisture and ionic contaminants. Examples of copper migration to form electroplated shorts in both thick film hybrid multilayer and printed circuit multilayer boards are discussed, and common features to both systems are outlined. Related mechanisms that may occur with the simple electrochemical (metal plating)

-more-
?
Display 3/3,AB,K/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

mechanisms to produce a broad array of electrical isolation breakdowns are also described. A brief review of the Sarnoff-developed RCA/GE multilayer copper materials system is presented. By design this system solves the problems raised regarding thick film copper multilayer latent failure mechanisms.

...Abstract: operated in the presence of moisture and ionic contaminants. Examples of copper migration to form electroplated shorts in both thick film hybrid multilayer and printed circuit multilayer boards are discussed, and...

...to both systems are outlined. Related mechanisms that may occur with the simple electrochemical (metal plating) mechanisms to produce a broad array of electrical isolation breakdowns are also described. A brief review of the Sarnoff-developed RCA/GE multilayer...

- end of display -
?
>>>Page beyond end of display invalid
?begin 411
11nov98 15:58:46 User233832 Session D156.3
$3.29 0.628 DialUnits File2
$7.80 4 Type(s) in Format 4 (UDF)
$7.80 4 Types
$11.09 Estimated cost File2
$0.14 0.031 DialUnits File32
$0.14 Estimated cost File32
$0.45 0.076 DialUnits File34
$0.45 Estimated cost File34
OneSearch, 3 files, 0.734 DialUnits FileOS
FTSNET 0.066 Hrs.
$11.68 Estimated cost th[redacted]rch
$24.17 Estimated total s[redacted] cost 10.636 DialUnits

File 411:DIALINDEX(R)

DIALINDEX(R)

*** DIALINDEX search results display in an abbreviated ***
*** format unless you enter the SET DETAIL ON command. ***
?set files alltech
You have 145 files in your file list.
(To see banners, use SHOW FILES command)
?set files allchem alltech
You have 182 files in your file list.
(To see banners, use SHOW FILES command)
?Cs (array? ? or semiconductor? ? or microchip? ?) (4n) (sputter? or coat?
>>>"C" command not valid in DIALINDEX.
?or plat????) (4n) (electri? or potential? ?) and cathode and electroplat???
>>>Unrecognizable command.
?
?s (array? ? or semiconductor? ? or microchip? ?) (4n) (sputter? or coat?

Your SELECT statement is:
s (array? ? or semiconductor? ? or microchip? ?) (4n) (sputter? or coat?

Items File
----- ----
>>>Unmatched parentheses
?or plat????) (4n) (electri? or potential? ?) and chatode? ? and electroplat???
>>>Unrecognizable command.
?s (array? ? or semiconductor? ? or microchip? ?)(4n)(electroplat???) (4n)(electri? or potential? ?)

Your SELECT statement is:
s (array? ? or semiconductor? ? or microchip? ?)(4n)(electroplat???) (4n)(electri? or potential? ?)

Items File
----- ----
1 2: INSPEC_1969-1998/Nov W3
6 6: NTIS_64-1998/Dec W1
7 8: Ei Compendex(R)_1970-1998/Nov W5
1 16: IAC PROMT(R)_1972-1998/Nov 11
2 32: METADEX(R)_1966-1998/Dec B2
1 103: Energy SciTec_1974-1998/Oct B1
1 108: Aerospace Database_1962-1998/Nov
12 144: Pascal_1973-1998/Oct
2 148: IAC Trade & Industry Database_1976-1998/Nov 11
Examined 50 files
1 192: Industry Trends & Anal._1997/Jun
1 317: Chemical Safety NewsBase_1981-1998/Nov
1 340: CLAIMS(R)/US Patent_1950-98/Nov 03
2 347: JAPIO_Oct 1976-1998/Jul.(UPDATED 981030)
2 351: DERWENT WPI_1963-1998/UD=9845;UP=9842;UM=9840
Examined 100 files
2 652: US Patents Fulltext_1971-1979
5 653: US Pat.Fulltext_1980-1989
Processing
5 654: US Pat.Full._1990-1998/Nov 03
5 763: Freedonia Market Res._1990-1998/Oct
1 62: SPIN(R)_1975-1998/Nov W2
Examined 150 files

19 files have one or more items; file list includes 182 files.

?save temp coat2
Temp SearchSave "TDCOAT2" stored
?begin hits
11nov98 16:09:32 User233832 Session D156.4
$6.40 5.117 DialUnits File411
$6.40 Estimated cost File411
FTSNET 0.183 Hrs.
$6.40 Estimated cost this search
$30.57 Estimated total session cost 15.753 DialUnits

SYSTEM:OS - DIALOG OneSearch
File 2:INSPEC 1969-1998/Nov W3

File 6:NTIS 64-1998/Dec W1

File 8:Ei Compendex(R) 1970-1998/Nov W5
(c) 1998 Engineering Info. Inc.
File 16:IAC PROMT(R) 1972-1998/Nov 11
(c) 1998 Information Access Co.
File 32:METADEX(R) 1966-1998/Dec B2
(c) 1998 Cambridge Scientific Abs
File 103:Energy SciTec 1974-1998/Oct B1
(c) 1998 Contains copyrighted material
*File 103: For access restrictions, see HELP RESTRICT.
File 108:Aerospace Database 1962-1998/Nov
(c) 1998 AIAA
File 144:Pascal 1973-1998/Oct
(c) 1998 INIST/CNRS
File 148:IAC Trade & Industry Database 1976-1998/Nov 11
(c) 1998 Info Access Co
File 192:Industry Trends & Anal. 1997/Jun
(c) 1997 Decision Resources Inc.
File 317:Chemical Safety NewsBase 1981-1998/Nov
(c) 1998 Royal Soc Chemistry
*File 317: Some records in accession number range 001725-002806 are having retrieval problems. Type HELP NEWS 317 for more infomation.
File 340:CLAIMS(R)/US Patent 1950-98/Nov 03
(c) 1998 IFI/Plenum Data Corp
*File 340: The annual reload is now available. New and enhanced data and Y2K changes have been added. Type HELP NEWS 340 for details.
File 347:JAPIO Oct 1976-1998/Jul.(UPDATED 981030)
(c) 1998 JPO & JAPIO
File 351:DERWENT WPI 1963-1998/UD=9845;UP=9842;UM=9840
(c)1998 Derwent Info Ltd
*File 351: Effective October 1, DialUnit rates adjusted for unrounding. See HELP NEWS 351 for details.
File 652:US Patents Fulltext 1971-1979
(c) format only 1998 The Dialog Corp.
*File 652: Reassignment data now current through 08/20/98
Reexamination, extension, expiration, reinstatement updated weekly.
File 653:US Pat.Fulltext 1980-1989
(c) format only 1998 Knight-Ridder Info
*File 653: Reassignment data now current through 08/20/98.
Reexamination, extension, expiration, reinstatement updated weekly.
File 654:US Pat.Full. 1990-1998/Nov 03
(c) format only 1998 The Dialog Corp.
*File 654: Reassignment data now current through 08/20/98.
Reexamination, extension, expiration, reinstatement updated weekly.
File 763:Freedonia Market Res. 1990-1998/Oct
(c) 1998 Freedonia Group Inc.
*File 763: KWIC costs $3.00 in this file.
File 62:SPIN(R) 1975-1998/Nov W2
(c) 1998 American Institute of Physics

Set Items Description
--- ----- -----------
?exs
Executing TDCOAT2
>>>SET HILIGHT: use ON, OFF, or 1-5 characters
Processing
Processing
Processed 10 of 19 files ...
Processing
Processing
Processing
Processing
Processing
Completed processing all files
907595 ARRAY? ?
2041236 SEMICONDUCTOR? ?
15115 MICROCHIP? ?
89283 ELECTROPLAT???
6129792 ELECTRI?
2788497 POTENTIAL? ?
S1 58 (ARRAY? ? OR SEMICONDUCTOR? ? OR MICROCHIP? ?)(4N)(ELECTROPLAT???) (4N)(ELECTRI? OR POTENTIAL? ?)
?rd
>>>Duplicate detection is not supported for File 340.
>>>Duplicate detection is not supported for File 347.
>>>Duplicate detection is not supported for File 351.
>>>Duplicate detection is not supported for File 652.
>>>Duplicate detection is not supported for File 653.
>>>Duplicate detection is not supported for File 654.
>>>Duplicate detection is not supported for File 763.

>>>Records from unsupported files will be retained in the RD set.
...examined 50 records (50)
...completed examining rec
S2 55 RD (unique it
?s s2 not Py>1997
55 S2
3018373 PY>1997
S3 53 S2 NOT PY>1997
?t s3/6,k/1-2 from each
>>>KWIC option is not available in file(s): 32

3/6,K/1 (Item 1 from file: 2)
DIALOG(R)File 2:(c) 1998 Institution of Electrical Engineers. All rts. reserv.

02590103 INSPEC Abstract Number: A86011316, B86007821
Title: Selective gold plating using laser beams
Publication Date: July 1985

Abstract: Studies laser induced selective gold deposition on intrinsic, p-type and n-type GaAs semiconductor substrates immersed in standard gold electroplating solution without external electric current and without masking. Possible mechanisms regarding the formation of ohmic or Schottky barrier contacts...

3/6,K/2 (Item 1 from file: 6)
DIALOG(R)File 6:Comp&distr 1998 NTIS, Intl Copyright All Righ. All rts. reserv.

1458851 NTIS Accession Number: PB89-217400
Electrolitic Deposited Ohmic Contacts on III-V Compound Semiconductors: A Review
1988

Descriptors: Semiconductor devices; *Fabrication; *Electroplating ; Electric contacts ; Reviews; Metals; Heat treatment; Vacuum deposition; Indium phosphides; Gallium arsenides; Gold; Zinc; Tin; Nickel...

3/6,K/3 (Item 2 from file: 6)
DIALOG(R)File 6:Comp&distr 1998 NTIS, Intl Copyright All Righ. All rts. reserv.

0890964 NTIS Accession Number: AD-A097 657/1/XAB
Extremely Uniform Electrodeposition of Submicron Schottky Contacts (Interim rept)
15 Apr 81

Descriptors: Schottky Barrier devices; * Semiconductor devices; *Electrodeposition; Electroplating ; Surfaces; Plating; Yield; Theory; Diodes; Electrical resistance; Metals; Pulses; Electric contacts; Fabrication

3/6,K/8 (Item 1 from file: 8)
DIALOG(R)File 8:(c) 1998 Engineering Info. Inc. All rts. reserv.

04508520
Title: Small sized synthesizer module for 1.9 GHZ digital mobile communication
Conference Title: Proceedings of the 1995 IEEE/CPMT 18th International Electronic Manufacturing Technology
Publication Year: 1995

Descriptors: Frequency synthesizers; Cellular telephone systems; Digital communication systems; LSI circuits; Electronics packaging; Electric wiring; Resonators; Semiconductor device structures; Variable frequency oscillators; Electroplating

3/6,K/9 (Item 2 from file: 8)
DIALOG(R)File 8:(c) 1998 Engineering Info. Inc. All rts. reserv.

04475570
Title: VLS growth of silicon whiskers on a patterned silicon-on-insulator (SOI) wafer
Publication Year: 1996

Descriptors: Silicon on insulator technology; Silicon wafers; Semiconducting silicon; Semiconductor growth; Crystal whiskers; Electric conductivity; Electric contacts; Electroplating ; Deformation

3/6,K/14 (Item 1 from file: 16)
DIALOG(R)File 16:(c) 1998 Information Access Co. All rts. reserv.

01735396
Platronics - Product Design & Development
1986

Products and Services: The Company is primarily engaged in the business of precision electroplating of electrical and electronic components and semiconductor products used in computers, data processing and communication equipment, and microwave transmission equipment. In general ...

3/6,K/15 (Item 1 from file: 32)
1881035
Tin-lead plating.
Aug. 1995

3/6,K/16 (Item 1 from file: 103)
DIALOG(R)File 103:(c) 1998 Contains copyrighted material. All rts. reserv.

00096889 ERA-01-012734; EDB-76-033771
Title: Process for solder coating silicon solar cells (Patent)
Publication Date: 5 Nov 1974

Abstract: A process for manufacturing silicon semiconductor devices comprises electroplating a solder coating directly onto the electrical contact surfaces of the silicon devices. The electrical contact surfaces are metal layers having a...

3/6,K/17 (Item 1 from file: 108)
DIALOG(R)File 108:(c) 1998 AIAA. All rts. reserv.

01677558 N86-16432
East Europe report: Science and technology
PUBLICATION DATE: 198512

...Of particular interest in this issue are articles on robot production in Hungary, and silicon semiconductor, electroplating process equipment, and composite electric contact materials developments in Poland. For individual titles see N86-16433 through N86-16437

3/6,K/18 (Item 1 from file: 144)
DIALOG(R)File 144:(c) 1998 INIST/CNRS. All rts. reserv.

11650802 PASCAL No.: 94-0504589
Electrochemical fabrication of cadmium chalcogenide microdiode arrays
1993

English Descriptors: Optoelectronic device; Diode array ; Semiconductor diode; Production process; Electroplating ; Electrical characteristic ; Microtubule; Microfibril; Chemical synthesis; Cadmium Chalcogenides; Cadmium Selenides; II-VI compound; Heterojunction; Binary compound...

3/6,K/19 (Item 2 from file: 144)
DIALOG(R)File 144:(c) 1998 INIST/CNRS. All rts. reserv.

11586726 PASCAL No.: 94-0472817
Metal electrodeposition on semiconductors. II: Description of the nucleation processes
1993

English Descriptors: Experimental study; Electrochemical reaction; Electroplating ; Transients; Electric current; Electrocrystallization; Rotating electrode; N type semiconductor ; Gallium Arsenides-ACT; Perchloric acid-SOL; Sodium Perchlorates-SOL; Ruthenium Chlorides-SOL; Transmission electron microscopy...

3/6,K/29 (Item 1 from file: 148)
DIALOG(R)File 148:(c) 1998 Info Access Co. All rts. reserv.

06229161 SUPPLIER NUMBER: 13015903 (USE FORMAT 7 OR 9 FOR FULL TEXT)
A Dream of Mind. (book reviews)
Dec 4, 1992
WORD COUNT: 522 LINE COUNT: 00039

... feel.
Finally, Jo Shapcott's Phrase Book (Oxford University Press, 5.99 [pounds]) confirms the potential of Electroplating The Baby. Here again an array of unlikely characters, Tom of "Tom and Jerry", "Superman", a "mad cow", are fully imagined...

3/6,K/30 (Item 2 from file: 148)
DIALOG(R)File 148:(c) 1998 Info Access Co. All rts. reserv.

06229159 SUPPLIER NUMBER: 13015959 (USE FORMAT 7 OR 9 FOR FULL TEXT)
House guests. (poetry books)
Dec 4, 1992
WORD COUNT: 990 LINE COUNT: 00074

... feel.
Finally, Jo Shapcott's Phrase Book (Oxford University Press, 5.99 [pounds]) confirms the potential of Electroplating The Baby. Here again an array of unlikely characters, Tom of "Tom and Jerry", "Superman", a "mad cow", are fully imagined...

3/6,K/31 (Item 1 from file: 192)
DIALOG(R)File 192:(c) 1997 Decision Resources Inc. All rts. reserv.

00002501
CN=FS92033
Word Count (abstract): 00035 Word Count (executive summary): 01954

Emerging Japanese Environmental Technologies and Markets
March 1992

Copr. Decision Resources, Inc. 1992

... difficult water treatment problems, such as removing heavy metals and other highly toxic chemicals from semiconductor, electroplating, and other electronic electrical plant waste streams.
By 1989, water treatment in Japan had grown to a 295 billion...

3/6,K/32 (Item 1 from file: 317)
DIALOG(R)File 317:(c) 1998 Royal Soc Chemistry. All rts. reserv.

00034414
IPC guidance on inorganic chemicals
PUBLICATION DATE: JAN 1994 (940100)

...ABSTRACT: Control on 1 May 1994. Affected operators, including those using ammonia, several inorganic processes,cadmium electroplating and battery, fluorescent light, semiconductor and electrical instrument manufacturers, have to apply for authorisation by 31 July 1994 and upgrade to new...

3/6,K/33 (Item 1 from file: 340)
DIALOG(R)File 340:(c) 1998 IFI/Plenum Data Corp. All rts. reserv.

1040146 7621940
C/ALKALI METAL GOLD CYANIDE METHOD; REACTING GOLD WITH HYDROGEN PEROXIDE
AND ALKALI METAL CYANIDE

Abstract:
...preparing alkali metal gold cyanide which has been found to be particularly useful in gold electroplating operations in the semiconductor industry in order to provide electrical contacts to semiconductor devices. In the process, finely divided gold metal particles are reacted with...

3/6,K/34 (Item 1 from file: 347)
DIALOG(R)File 347:(c) 1998 JPO & JAPIO. All rts. reserv.

04765532
METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE

ABSTRACT
... of thermal resistance etching metal for application of plating current using the wiring of the semiconductor device as the electricity feeding circuit for electroplating on the back side and omitting the processing

of the electricity feeding wire after the...

3/6,K/35 (Item 2 from file: 347)
DIALOG(R)File 347:(c) 1998 JPO & JAPIO. All rts. reserv.

04358291
ELECTROPLATING METHOD

ABSTRACT
... of a flat plate near the pins 2a. In this constitution, when the pin grid array 2 is given electroplating , the electric field is prevented from being concentrated on the tip of the pins 2a to almost...

3/6,K/36 (Item 1 from file: 351)
DIALOG(R)File 351:(c)1998 Derwent Info Ltd. All rts. reserv.

009719755 **Image available**
WPI Acc No: 93-413309/199351
Title Terms: SELECT; ELECTROPLATING; ARRAY; CLOSELY; SPACE; CONTACT;
MINIATURE; ELECTROPLATING; CELL; ENCOMPASSING; AREA; CONTAIN; ELECTRIC;
CONTACT

...Abstract (Basic): Selectively electroplating a metallic coating onto an array of closely spaced small electrical contacts comprises providing an electroplating cell to encompass and sealingly enclose the contacts to be coated within a plating chamber...

3/6,K/37 (Item 2 from file: 351)
DIALOG(R)File 351:(c)1998 Derwent Info Ltd. All rts. reserv.

000742465
WPI Acc No: 70-79805R/197043
Title Terms: HYBRID; INTEGRATE; CIRCUIT; COMPRISE; RESIST; SEMICONDUCTOR;
ELEMENT

...Abstract (Basic): The device has a non-conductive carrier-plate, which has mutually insulated, electrically conductive projections electroplated on one surface. At least one semiconductor element is position on this surface between the projections, whose height above the of one...

3/6,K/38 (Item 1 from file: 652)
DIALOG(R)File 652:(c) format only 1998 The Dialog Corp. All rts. reserv.

00863212
ALKALI METAL GOLD CYANIDE METHOD
[REACTING GOLD WITH HYDROGEN PEROXIDE AND ALKALI METAL CYANIDE]
FULL TEXT: 172 lines

ABSTRACT

... preparing alkali metal gold cyanide which has been found to be particularly useful in gold electroplating operations in the semiconductor industry in order to provide electrical contacts to semiconductor devices. In the process, finely divided gold metal particles are reacted with...

3/6,K/39 (Item 2 from file: 652)
DIALOG(R)File 652:(c) format only 1998 The Dialog Corp. All rts. reserv.

00821924
METHOD OF SELECTIVE ELECTROPLATING AND PRODUCTS PRODUCED THEREBY
[GOLD, ALUMINUM]
FULL TEXT: 646 lines

...first step in the practice of the method of the present invention to the selective electroplating of semiconductor devices, an electrically conductive first coating is formed on the support member 26. This coating, which is identified...

3/6,K/40 (Item 1 from file: 653)
DIALOG(R)File 653:(c) for[illegible]ly 1998 Knight-Ridder Info. All rts. reserv.

01736592
METALLIZING PASTE
[TUNGSTEN, FRIT, BINDER, HIGH TEMPERATURE FIRING]
FULL TEXT: 137 lines

... components of the package. These form a metallic base onto which other metals may be electroplated to provide electrical and thermal contact with the semiconductor device within the package. Many metals may be used in the pastes, for example, silver...

3/6,K/41 (Item 2 from file: 653)
DIALOG(R)File 653:(c) format only 1998 Knight-Ridder Info. All rts. reserv.

01420113
METHOD OF ELECTRO-COATING A SEMICONDUCTOR DEVICE
FULL TEXT: 1058 lines

... bath 46 and the counter-electrode 48 is dependent upon the particular metallic material being electroplated onto the semiconductor device 32. A source of electrical current such as a battery 50 has one terminal 50a thereof electrically connected to the...

...a wire 54 to the substrate 11, said substrate forming the second surface of the semiconductor device 32, thereby completing an electrical circuit through the electroplating bath 46.

Also included in the electroplating apparatus is a light source shown generally by... by numeral 62a in FIG. 4A) required for an electro-coating process such as an electroplating process to proceed in such a semiconductor device, virtually no electrical current will flow therethrough and electroplating will proceed at a negligible rate, if at all. In order to initiate a sufficient...

3/6,K/45 (Item 1 from file: 654)
DIALOG(R)File 654:(c) format only 1998 The Dialog Corp. All rts. reserv.

02484198
SEMICONDUCTOR CHIP CONTACT BUMP STRUCTURE
FULL TEXT: 379 lines

... chip according to claim 4, wherein said plurality of contact bumps are made from an electroplated electrically conductive material.

6. A semiconductor chip contact bump structure comprising:
a semiconductor substrate;
an electrode pad formed on said semiconductor...

3/6,K/46 (Item 2 from file: 654)
DIALOG(R)File 654:(c) format only 1998 The Dialog Corp. All rts. reserv.

02332876
PIN GRID ARRAY PACKAGE WITH PIN THROUGH PLATING
FULL TEXT: 198 lines

... to corrosion. In the prior art, a conductive plate is welded to the pin grid array to electrically short out leads during the electroplating process. These leads are held at substantially the same electrical potential to ensure a relatively...

... for example, to integrated circuit components. These pins are arranged to form a pin grid array . Prior to electroplating the pins, a detachable, electrically -conductive plate is removably attached to the pins of the array so that the pins...

3/6,K/49 (Item 1 from file: 763)
DIALOG(R)File 763:(c) 1998 Freedonia Group Inc. All rts. reserv.

00131142

COMPANY PROFILES: LeaRonal Incorporated - Part 1 of 2

Main Title: ELECTRONIC CHEMICALS TO 2001
Pub. Date: SEPTEMBER 1997
Word Count: 334 (1 pp.)

* FOR FULL TEXT, USE FORMAT 9 *

...ENDURAGLO, AUROJET,
AUROSPEED, AUROSPOT, AUROTAB and RONOVEL tradenames. Electronics
applications of the Company's gold electroplating processes
include
semiconductors , printed circuit boards and electrical contacts.
These
electronic components are found in such end use items as missile
guidance systems...

3/6,K/50 (Item 2 from file: 763)

00097597

COMPANY PROFILES: LeaRonal Incorporated

Main Title: CORROSION INHIBITORS TO 2000
Pub. Date: DECEMBER 1995
Word Count: 219 (1 pp.)

* FOR FULL TEXT, USE FORMAT 9 *

...manufacturers of watches, jewelry and other ornamental
items. Electronics applications of the Company's gold electroplating
processes include semiconductors , printed circuit boards and electrical
contacts. These electronic components are found in such end use items
as missile guidance systems...
?cost
11nov98 16:19:02 User233832 Session D156.5
$1.08 0.205 DialUnits File2
$0.20 1 Type(s) in Format 95 (KWIC)
$0.20 1 Types
$1.28 Estimated cost File2
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FTSNET 0.166 Hrs.
$24.56 Estimated cost this search
$55.13 Estimated total session cost 19.258 DialUnits

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11nov98 16:19:15 User233832 Session D156.5
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$0.50 2 Types
$0.63 Estimated cost File763
$0.07 0.039 DialUnits File62
$0.07 Estimated cost File62
OneSearch, 19 files, 3.505 DialUnits FileOS
FTSNET 0.166 Hrs.
$24.56 Estimated cost this search
$55.13 Estimated total session cost 19.258 DialUnits

SYSTEM:HOME
Menu System II: D2 version 1.7.8 term=DLINK
*** DIALOG HOMEBASE(SM) Main Menu ***
Information:
1. Announcements (new files, reloads, etc.)
2. Database, Rates, & Command Descriptions
3. Help in Choosing Databases for Your Topic
4. Customer Services (telephone assistance, training, seminars, etc.)
5. Product Descriptions
Connections:
6. DIALOG Menus(SM)
7. DIALOG Business Connection(R) and DIALOG Headlines(SM)
8. DIALOG(R) Document Delivery
9. Data Star(R)
10. Other Online Menu Services & Files (MoneyCenter(R), BNA, etc.)

/H = Help /L = Logoff /NOMENU = Command Mode

Enter an option number to view information or to connect to an online service. Enter a BEGIN command plus a file number to search a database (e.g., B1 for ERIC).
?

```
Trying 11180...Open

PLEASE ENTER HOST PORT ID:
PLEASE ENTER HOST PORT ID:x
LOGINID:d180JXR
PASSWORD:
TERMINAL (ENTER 1, 2, 3, 4, OR ?):□3


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 *                                                               *
 *          Welcome to MESSENGER (APS Text) at USPTO             *
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 *    NOVEMBER 10,1998  for U.S. Patent Text Data.               *
 *    NOVEMBER 10,1998  for U.S. Current Classification Data.    *
 *    NOVEMBER 10,1998  for U.S. Patent Image Data.              *
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 *      * PLEASE USE 305-9000 FOR NEW TELEPHONE NUMBER *         *
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 * More U.S. patent data is now available on APS.  The new       *
 * USOCR file contains patents issued in 1970, plus some         *
 * patents that were missing from the USPAT file.  See the       *
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 *  particular purpose; nor assumes any legal liability or       *
 *  responsibility for any party's use, or the results of        *
 *  such, of the data.                                           *
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 *              Help Desk --> 703-305-9000                       *
 *                                                               *
 *    The Help Desk is staffed for APS support 7 days/week.      *
 *      Monday through Friday:       6:30am - 9:00pm             *
 *      Saturday, Sunday, Holidays: 8:30am - 5:00 pm             *
 *                                                               *
 *    The Help Desk staff at this number will handle all APS     *
 *    related questions.                                         *
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 *              W E L C O M E   T O   T H E                      *
 *         U. S.   P A T E N T   T E X T   F I L E               *
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=> s electroplat?

L1        15787 ELECTROPLAT?

=> s l1 and annode array

            143 ANNODE
         178516 ARRAY
              0 ANNODE ARRAY
                  (ANNODE(W)ARRAY)
L2            0 L1 AND ANNODE ARRAY
```

=> s cathode array#

```
        101153 CATHODE
        187353 ARRAY#
L3         167 CATHODE ARRAY#
                (CATHODE(W)ARRAY#)
```

=> s l1 and l3

```
L4           6 L1 AND L3
```

=> d 1-6

1. 5,693,235, Dec. 2, 1997, Methods for manufacturing cold **cathode arrays**; Nanchou David Liu, et al., 216/11, 39, 49, 88; 313/310; 445/24, 50, 51 [IMAGE AVAILABLE]

2. 5,458,747, Oct. 17, 1995, Insitu bio-electrokinetic remediation of contaminated soils containing hazardous mixed wastes; Robert E. Marks, et al., 205/702; 204/515; 205/688, 766, 771; 588/204 [IMAGE AVAILABLE]

3. 5,170,092, Dec. 8, 1992, Electron-emitting device and process for making the same; Kaoru Tomii, et al., 313/310, 309, 311, 336 [IMAGE AVAILABLE]

4. 5,053,673, Oct. 1, 1991, Field emission cathodes and method of manufacture thereof; Kaoru Tomii, et al., 313/308, 309, 336; 445/24, 52 [IMAGE AVAILABLE]

5. 4,759,771, Jul. 26, 1988, Packaging technique for batteries; Steven L. Morra, 29/623.1; 264/272.21; 429/162 [IMAGE AVAILABLE]

6. 4,482,448, Nov. 13, 1984, Electrode structure for electrolyser cells; Christopher T. Bowen, et al., 204/284, 286 [IMAGE AVAILABLE]

=> d 1-6 cit ab kwic

1. 5,693,235, Dec. 2, 1997, Methods for manufacturing cold **cathode arrays**; Nanchou David Liu, et al., 216/11, 39, 49, 88; 313/310; 445/24, 50, 51 [IMAGE AVAILABLE]

US PAT NO: 5,693,235 [IMAGE AVAILABLE] L4: 1 of 6

ABSTRACT:
A cold cathode emitter structure is described together with two methods for manufacturing it. These methods are cost effective and relatively simple to implement. A key feature is the incorporation of chemical-mechanical polishing into the process. This allows the micro-cones, that serve as cold cathodes, to be easily positioned so that their apexes are located at the correct height relative to the gate lines. A second important feature is that the openings in the gate lines through which the emitted electrons will pass are made to be significantly narrower than in conventional designs.
TITLE: Methods for manufacturing cold **cathode arrays**

DETDESC:

DETD(5)

Referring . . . additional conductive layer 27 over all exposed surfaces of layer 24. The preferred method for depositing layer 27 has been **electroplating** but other methods, such as evaporation could also be used. Typically, layer 27 has comprised silicon, molybdenum, or aluminum to. . .

DETDESC:

DETD(11)

Referring . . . all exposed surfaces of layers 24 and the remainder of layer 137. The preferred method for achieving this has been **electroplating** but other methods, such as evaporation could also be used. Typically, the additional layer has comprised silicon, molybdenum, or aluminum. . .

CLAIMS:

CLMS(1)

What is claimed is:

1. A method for manufacturing a cold **cathode array** comprising the sequential steps of:
providing an insulating substrate having an upper surface;
forming cathode columns on the upper surface of. . .

CLAIMS:

CLMS(8)

8. The method of claim 1 wherein the method for depositing said third conductive layer comprises **electroplating** or vacuum evaporation at grazing incidence.

2. 5,458,747, Oct. 17, 1995, Insitu bio-electrokinetic remediation of contaminated soils containing hazardous mixed wastes; Robert E. Marks, et al., 205/702; 204/515; 205/688, 766, 771; 588/204 [IMAGE AVAILABLE]

US PAT NO: 5,458,747 [IMAGE AVAILABLE] L4: 2 of 6

ABSTRACT:
The invention relates to insitu bio-electrokinetic remediation of contaminated soil containing hazardous mixed wastes as organic pollutants and hazardous heavy metals. Bio-remediation of the organic pollutants is followed by removal of the hazardous material. Cultured micro-organisms, nutrients and growth factors are added to clean soil adjacent to contaminated soil. Positive anodes and negative cathodes are placed in the microbial-loaded clean soil adjacent to the contaminated soil. The negative cathode is closest to the interface of the clean and contaminated soil. DC current is applied between the electrodes and water containing cultured microorganisms is pushed by the electrokinetic pumping effect into the contaminated site. The acid generated at the anode is not allowed to enter the contaminated soil. Cultured microorganisms are introduced into clean soil on the opposite side of the contaminated soil. DC current is reversed to change the original anode to cathode and cathode to anode. Micro-organism laden water is pulled into the contaminated site. The push-pull current reversal process is repeated to increase insitu biodegradation efficiency. When the biological oxidation of organic pollutants is complete, the acid front enters the contaminated soil for removal of hazardous metals. Hazardous metals precipitate near or **electroplate** on the cathode or are recovered from fluid collected at the cathode. Solubilizing materials are added to the water near the cathode to minimize the precipitation reaction. Fluids collected at the cathode are pumped through a treatment system before water is returned to the soil.

ABSTRACT:
The . . . pollutants is complete, the acid front enters the contaminated soil for removal of hazardous metals. Hazardous metals precipitate near or **electroplate** on the cathode or are recovered from fluid collected at the cathode. Solubilizing materials are added to the water near. . .

SUMMARY:

BSUM(121)

Control . . . will electrodeposit on the cathode. Mass balances for one-dimensional bench testing of cadmium Cd(II) and lead Pb(II) showed 75-95 percent **electroplated** on the cathodes.

SUMMARY:

BSUM(161)

FIG. . . . electrokinetic soil processing will be performed using one-dimensional arrays. This type of remediation will mean closer placements between anode and **cathode arrays**. In terms of specific spacings, the distances between anodes will be 2.5 feet and the distance between anode arrays and **cathode arrays** will be 5 feet. That should reduce the probability of finding any non-remediated areas within the pilot site at the. . .

3. 5,170,092, Dec. 8, 1992, Electron-emitting device and process for making the same; Kaoru Tomii, et al., 313/310, 309, 311, 336 [IMAGE AVAILABLE]

US PAT NO: 5,170,092 [IMAGE AVAILABLE] L4: 3 of 6

ABSTRACT:
An electron-emitting device including; electrical insulating substrates (1); an intermediate layer having a metal layer (2) and an insulating material layer (3) or having an insulating material layer (3), superposed in the thickness direction of said electrical insulating substrates (1) so as to be provided between said electrical insulating substrates (1) in the manner that it is recessed from one side surfaces of said electrical insulating substrates (1); a cathode material (4) provided at the middle portion of said intermediate layer, one end of said cathode material (4) protruding from the insulating material layer (3) that constitutes said intermediate layer; and a gate electrode (5) provided on said electrical insulating substrate (1) on the side where said intermediate layer is recessed.

SUMMARY:

BSUM(8)

Another . . . so as to be in the same state as the combined substrates 124 having been not separated. A thin-film cold **cathode array** can be thus obtained. (Japanese Patent Publication No. 54-17551).

SUMMARY:

BSUM(26)

The . . . adhesive. In order to form the above mask with ease, the mask may be formed by depositing a metal by **electroplating** on the uncovered surface of the above cathode material and the above intermediate layer comprising a metal layer or an. . .

DETDESC:

DETD(13)

Subsequently, . . . shown in FIG. 4G, a mask 11 comprising a metal layer with a given thickness is selectively formed by conventional **electroplating** on the uncovered surfaces of the cathode materials 4 and the metal layers 2a and 2b. In the case when. . .

DETDESC:

DETD(34)

Subsequently, . . . shown in FIG. 9G, a mask 211 comprising a metal layer with a given thickness is selectively formed by conventional **electroplating** on each of the cathode materials 203, the uncovered surfaces of the one side of the insulating material layers 202a. . .

4. 5,053,673, Oct. 1, 1991, Field emission cathodes and method of manufacture thereof; Kaoru Tomii, et al., 313/308, 309, 336; 445/24, 52 [IMAGE AVAILABLE]

US PAT NO: 5,053,673 [IMAGE AVAILABLE] L4: 4 of 6

ABSTRACT:
Structures and methods of manufacture for field emission cathodes having cathode tips of minute size, whereby a block formed of pairs of substrates each having a patterned thin layer of cathode material sandwiched therebetween is sliced into a plurality of sections, to obtain array substrates each having an array of exposed regions of cathode material. A metal layer for constituting electron extraction electrodes and corresponding extraction apertures is formed over these exposed regions and appropriately shaped, after first forming mask layer portions upon the exposed cathode material regions.

DETDESC:

DETD(7)

A . . . thermal adhesion using a material such as low melting-point

glass frit, etc., in order to ensure that a field emission **cathode array** substrate (described hereinafter) will have sufficient solidity.

DETDESC:

DETD(14)

The field emission **cathode array** can be considered to be completed at the stage now reached, shown in FIG. 3(j). However as shown in FIG.. . .

DETDESC:

DETD(19)

FIG. 6 is a partial oblique view of a flat fluorescent display panel that is formed by combining a field emission **cathode array** manufactured by a method according to the present invention (in this example, by the first method according to the present. . .

DETDESC:

DETD(25)

In . . . exposed surfaces (i.e. not covered with the photoresist) of the portions 23' are covered with a metal layer 26, by **electroplating** processing, to a predetermined thickness, e.g. to approximately 1 .mu.m. This metal layer 26 is subsequently removed by etching, using. . .

DETDESC:

DETD(27)

Upon . . . thereby removed at the same time as the photoresist 24. As a result, the upper surface of each of the **electroplated** metal layer portions 26 become exposed, and etching is then executed to remove the metal layer 26, by using the. . . 29 are formed around the tops of the upwardly protruding cathode material portions 23'. In this way, a field emission **cathode array** is formed, having an electron extraction layer (metal layer) 28 which has electron extraction apertures formed therein, appropriately positioned with. . .

DETDESC:

DETD(28)

In this field emission **cathode array**, the side surface of each of the cathode material layer 23 portions is spaced apart from the insulating layer 27. . .

DETDESC:

DETD(30)

A . . . the array pattern of upwardly protruding portions of the cathode material 23' has a metal layer 26 formed thereon by **electroplating**. Thereafter, as shown in FIG. 9(d) and in the same way as for the third embodiment described above, the insulating. . .

DETDESC:

DETD(37)

FIG. . . . a field emission cathode can be clearly understood from FIG. 15, which is an oblique view of a field emission **cathode array** used in a flat panel display unit. The upper surface of the insulating layer 33 is made lower than an. . .

DETDESC:

DETD(45)

Next, . . . 13(f). This array substrate 40 has an array of of cathode material layer 34 portions, which defines the field emission **cathode array** pattern, with exposed regions of these cathode material layer 34 portions appearing on each of opposing faces of the substrate.. . .

DETDESC:

DETD(67)

A . . . 17(g). This array substrate 45 has an array of of cathode material layer 34 portions, which defines the field emission **cathode array** pattern, with exposed regions of these cathode material layer 34 portions appearing on each of opposing faces of the substrate.. . .

DETDESC:

DETD(68)

Next, . . . of the substrate 45, this mask layer consisting of a metal layer having a predetermined thickness, deposited by the usual **electroplating** process. The mask layer 46 is patterned such as to cover the exposed regions of the insulating layers 41a, 41b. . .

DETDESC:

DETD(72)

A field emission **cathode array** formed by the above method of manufacture is suitable for combining with a transparent substrate having a layer of photo-emissive. . .

5. 4,759,771, Jul. 26, 1988, Packaging technique for batteries; Steven L. Morra, 29/623.1; 264/272.21; 429/162 [IMAGE AVAILABLE]

US PAT NO: 4,759,771 [IMAGE AVAILABLE] L4: 5 of 6

ABSTRACT:
The invention covers a method of producing packaged batteries having high internal resistance utilizing semiconductor manufacturing techniques. These include forming an assembly for each battery to be formed of an anode plate and a cathode plate in spaced parallel relationship with a low concentration electrolyte in between the plates. The assembly is then arranged within a recess formed between upper and lower electrically conductive mold elements of a transfer mold. A temporary short circuit is thus created between the plates. The recess defines a battery package configuration. A plastic molding compound is then injected into the recess through a distribution aperture communication with the recess.

DETDESC:

DETD(10)

The . . . the lithium material, for example, to a thickness of approximately five mils on the anode plate 25. In lieu of **electroplating**, a lithium foil, for example placed in physical contact with the anode plate 25 may be substituted.

CLAIMS:

CLMS(2)

2. . . . said steps of forming said assembly and arranging said assembly within said recess comprises the steps of first arranging said **cathode array** into said lower mold element, applying said electrolyte to said **cathode array**, placing said anode array over said electrolyte, and positioning said upper mold element over said lower mold element, thus forming. . .

CLAIMS:

CLMS(3)

3. The method according to claim 2 wherein said step of applying said electrolyte onto said **cathode array** so as to be positioned between said anode and cathode plates comprises the step of arranging an electrolyte retaining central material onto said **cathode array**, and thereafter dispensing into said electrolyte retaining central material an electrolyte materal.

CLAIMS:

CLMS(5)

5. The method according to cla[illegible]1 further comprising the step of inserting an intermediate mater[illegible] between said electrolyte and said cathode array.

6. 4,482,448, Nov. 13, 1984, Electrode structure for electrolyser cells; Christopher T. Bowen, et al., 204/284, 286 [IMAGE AVAILABLE]

US PAT NO: 4,482,448 [IMAGE AVAILABLE] L4: 6 of 6

ABSTRACT:
An electrode structure for electrolytic cells is disclosed. The electrode structure comprises a central current-collector structure having high points on at least one side and adapted to be placed vertically in the electrolytic cell, and a porous electrode secured to the high points of the current-collector structure on at least one side thereof so as to form an essentially-planar pre-electrode surface. The high points of the current-collector are arranged so as to allow an unimpeded rise of the evolved gases to the top of the electrode.

SUMMARY:

BSUM(7)

Several . . . use of a thin corrugated structure, internal to the pre-electrode, to provide a spring effect and improve the compression of anode/separator/**cathode array** while allowing for flexibility during cell assembly. Canadian Pat. No. 1,086,256, issued Sept. 23, 1980, features the use of a. . .

SUMMARY:

BSUM(13)
(d) . . . materials of construction having regular surfaces which can be reliably and economically protected from corrosion in the electrolyte by the **electroplating** of nickel or other corrosion-resistant coatings.

```
=> multiple (5a) cathodes    (p) electroplating

'MULTIPLE' IS NOT A RECOGNIZED COMMAND

=> s multiple (5a) cathodes    (p) semiconductor# and electroplating

        378917 MULTIPLE
         19468 CATHODES
        160069 SEMICONDUCTOR#
             2 MULTIPLE (5A) CATHODES    (P) SEMICONDUCTOR#
         13159 ELECTROPLATING
L5           0 MULTIPLE (5A) CATHODES    (P) SEMICONDUCTOR# AND ELECTROPLAT
ING

=> s multiple (5a) cathodes    (p) semiconductor#

        378917 MULTIPLE
         19468 CATHODES
        160069 SEMICONDUCTOR#
L6           2 MULTIPLE (5A) CATHODES    (P) SEMICONDUCTOR#

=> d 1-6 cit ab kwic

      2 ANSWERS ARE AVAILABLE. SPECIFIED ANSWER NUMBER EXCEEDS ANSWER SET
SIZE
ENTER ANSWER NUMBER OR RANGE (1):1-2
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1. 4,713,657, Dec. 15, 1987, System for increasing the brightness of a multibeam dot-pattern cathode ray display tube; Alessandro Tischer, 345/14, 26 [IMAGE AVAILABLE]

US PAT NO: 4,713,657 [IMAGE AVAILABLE] L6: 1 of 2

ABSTRACT:
In order to increase the light intensity and legibility of the characters displayed on the screen of a cathode-ray tube, all dots of the same vertical line of the character or even all dots of this character are simultaneously excited. This is done by means of a multiple cathode while the line is scanned, so that excitation of the dots is repeated a predetermined number of times with short time intervals. When all the

dots of the character are simultaneously excited, a shift of the picture transmitted by the multiple cathode is carried out at the same time in synchronism with and in opposite direction to the line scan, to compensate for the formation of stripes in the displayed picture which would otherwise be produced by the scan.

DETDESC:

DETD(17)

The . . . understood from the enlarged drawing of FIG. 4. In FIG. 4 CT.sub.1 -CT.sub.35 represent the several independent emitters of the **multiple** cathode, (preferably cold **semiconductor-cathodes** with field effect emission), RS.sub.1 -RS.sub.7 represent the several shift registers, which are preferably included in the multiple cathode CT,. . .

2. 4,288,912, Sep. 15, 1981, Method of constructing and processing a diode capacitor assembly; Walter L. Wills, et al., 438/109; 29/827; 257/532, 666, 686, 926; 363/61 [IMAGE AVAILABLE]

US PAT NO: 4,288,912 [IMAGE AVAILABLE] L6: 2 of 2

ABSTRACT:
Wafers of silicon semiconductor material are stacked, bonded and severed to form a plurality of semiconductor diodes. One or more capacitor bodies are physically and electrically joined with these diodes, either by means of the capacitor bodies themselves or by means of an intermediate lead frame structure, in order to facilitate the handling and processing of the assembly as a unit.

SUMMARY:

BSUM(10)

Briefly, . . . objects, a diode/capacitor assembly, in accordance with this invention, is made by performing the steps of: providing a plurality of **semiconductor** diodes having anodes and **cathodes**, providing a **multiple**-plate capacitor having a predetermined plate configuration, physically and electrically joining predetermined plates of the multiple plate capacitor with predetermined ones. . .

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=> s coat#### (5a) pattern# or array#

        447231 COAT####
        362684 PATTERN#
          8703 COAT#### (5A) PATTERN#
        187353 ARRAY#
L1      194526 COAT#### (5A) PATTERN# OR ARRAY#

=> s coat#### (5a) pattern# or array# (p) electroplating

        447231 COAT####
```

```
      362684 PATTERN#
        8703 COAT#### (5A) PATTERN#
      187353 ARRAY#
       13159 ELECTROPLATING
         301 ARRAY# (P) ELECTROPLATING
L2      8985 COAT#### (5A) PATTERN# OR ARRAY# (P) ELECTROPLATING

=> s coat#### (5a) pattern#  array# (p) electroplating


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SEARCH ENDED BY USER

=> s coat#### (5a) pattern####  array# (p) electroplating

      447231 COAT####
      375171 PATTERN####
      187353 ARRAY#
         686 PATTERN####  ARRAY#
               (PATTERN####(W)ARRAY#)
       13159 ELECTROPLATING
L3         0 COAT#### (5A) PATTERN####  ARRAY# (P) ELECTROPLATING

=> s electroplat##### (p) (semiconductor? or microchip##)

       15784 ELECTROPLAT#####
      160078 SEMICONDUCTOR?
        1797 MICROCHIP##
L4       794 ELECTROPLAT##### (P) (SEMICONDUCTOR? OR MICROCHIP##)

=> s electroplat##### (5a) (semiconductor? or microchip##)

       15784 ELECTROPLAT#####
      160078 SEMICONDUCTOR?
        1797 MICROCHIP##
L5       132 ELECTROPLAT##### (5A) (SEMICONDUCTOR? OR MICROCHIP##)

=> s electroplat##### (5a) (semiconductor? or microchip##) (5a) (area?)

       15784 ELECTROPLAT#####
      160078 SEMICONDUCTOR?
        1797 MICROCHIP##
      989838 AREA?
L6         4 ELECTROPLAT##### (5A) (SEMICONDUCTOR? OR MICROCHIP##) (5A)
(AR
             EA?)

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     4 ANSWERS ARE AVAILABLE. SPECIFIED ANSWER NUMBER EXCEEDS ANSWER SET
SIZE
ENTER ANSWER NUMBER OR RANGE (1):d 1-4  cit ab kwic

ANSWER NUMBERS NOT CORRECTLY SPECIFIED
ENTER ANSWER NUMBER OR RANGE (1):end


=> d 1-4 cit ab kwic
```

1. 5,679,234, Oct. 21, 1997, Process of forming miniature pattern well controlled in thickness on semiconductor wafer through selective electroplating; Takafumi Imamura, 205/123; 204/192.34; 205/124, 157, 159, 164, 165, 166, 167, 184, 186, 187, 188, 189; 438/926 [IMAGE AVAILABLE]

US PAT NO: 5,679,234 [IMAGE AVAILABLE] L6: 1 of 4

ABSTRACT:
A mask layer is formed on a conductive layer covering not only a central area assigned to integrated circuits but also a vacant peripheral **area** of a **semiconductor** wafer, and an **electroplating** system allows metallic miniature patterns to grow on the conductive layer over the vacant peripheral area as well as extremely small areas of the conductive layer over the central area so as to make current fluctuation negligible.

ABSTRACT:

A . . . formed on a conductive layer covering not only a central area assigned to integrated circuits but also a vacant peripheral **area** of a **semiconductor** wafer, and an **electroplating** system allows metallic miniature patterns to grow on the conductive layer over the vacant peripheral area as well as extremely. . .

2. 4,565,607, Jan. 21, 1986, Method of fabricating an electroplated substrate; Joseph J. Hanak, et al., 438/66; 205/77; 438/71, 72, 80 [IMAGE AVAILABLE]

US PAT NO: 4,565,607 [IMAGE AVAILABLE] L6: 2 of 4

ABSTRACT:
An electroplated substrate, characterized by a substantially reduced number of surface defects, for the fabrication of thin film electronic devices. The substrate is prepared in an electroforming process by electroplating onto and removing a metallic layer from the surface of a specifically prepared, substantially defect-free mandril. The substrate may be provided with a preselected surface finish by either (1) texturing the mandril or (2) controlling the parameters of the electroplating process to control the morphology of the deposit. The substrate is especially adapted for the fabrication of thin film photoresponsive devices which incorporate specular or diffuse back reflectors, since the texture may be controlled to provide for the appropriate type of reflectivity. Large **area**, thin film **semiconductor** devices incorporating the **electroplated** substrate are readily scribed to form electrically isolated small area segments for the fabrication of modules, arrays and the like.

ABSTRACT:
An . . . specular or diffuse back reflectors, since the texture may be controlled to provide for the appropriate type of reflectivity. Large **area**, thin film **semiconductor** devices incorporating the **electroplated** substrate are readily scribed to form electrically isolated small area segments for the fabrication of modules, arrays and the like.

3. 4,530,739, Jul. 23, 1985, Method of fabricating an electroplated substrate; Joseph J. Hanak, et al., 427/74; 136/256, 258, 259; 205/77 [IMAGE AVAILABLE]

US PAT NO: 4,530,739 [IMAGE AVAILABLE] L6: 3 of 4

ABSTRACT:
An electroplated substrate, characterized by a substantially reduced number of surface defects, for the fabrication of thin film electronic devices. The substrate is prepared in an electroforming process by electroplating onto and removing a metallic layer from the surface of a specifically prepared, substantially defect-free mandril. The substrate may be provided with a preselected surface finish by either (1) texturing the mandril or (2) controlling the parameters of the electroplating process to control the morphology of the deposit. The substrate is especially adapted for the fabrication of thin film photoresponsive devices which incorporate specular or diffuse back reflectors, since the texture may be controlled to provide for the appropriate type of reflectivity. Large **area**, thin film **semiconductor** devices incorporating the **electroplated** substrate are readily scribed to form electrically isolated small area segments for the fabrication of modules, arrays and the like.

ABSTRACT:
An . . . specular or diffuse back reflectors, since the texture may be controlled to provide for the appropriate type of reflectivity. Large **area**, thin film **semiconductor** devices incorporating the **electroplated** substrate are readily scribed to form electrically isolated small area segments for the fabrication of modules, arrays and the like.

4. 3,571,916, Mar. 23, 1971, SCHOTTKY EDGE CONTACT DIODE; Franz Joseph Landkammer, 438/125; 257/483, 503; 438/570, 571, 572, 943 [IMAGE AVAILABLE]

US PAT NO: 3,571,916 [IMAGE AVAILABLE] L6: 4 of 4

ABSTRACT:
A semiconductor diode is disclosed made so that the Schottky barrier junction is applied to the edge of a semiconductor water instead of some arbitrary point on its surface. The area, where contact is made to an

electrode', is entirely applied an insulator adjacent to the edge junction. This structure provid large bonding area with small junc n area.

SUMMARY:

BSUM(3)

Microwave . . . of the most important problems of fabricating effective Schottky barrier diodes for high frequency application consists in making intimate small **area** contacts of metal and **semiconductor** either by evaporating or **electroplating** the metal onto the semiconductor. However, this requirement is diametrically opposed to the requirement of making electrical contact to these. . .

```
=> s electroplat##### (5a) (semiconductor? or microchip##) (5a) (array#)

         15784 ELECTROPLAT#####
        160078 SEMICONDUCTOR?
          1797 MICROCHIP##
        187353 ARRAY#
L7           1 ELECTROPLAT##### (5A) (SEMICONDUCTOR? OR MICROCHIP##) (5A)
(AR
               RAY#)

=> d 1 cit ab kwic
```

1. 5,240,588, Aug. 31, 1993, Method for **electroplating** the lead pins of a **semiconductor** device pin grid **array** package; Hiroyuki Uchida, 205/125; 29/840; 205/123; 438/125 [IMAGE AVAILABLE]

US PAT NO: 5,240,588 [IMAGE AVAILABLE] L7: 1 of 1

ABSTRACT:
A method for manufacturing a pin grid array type semiconductor device package including a substrate having a principle surface and a bottom surface opposing the principal surface, a plurality of patterned metallized conductors formed in the substrate or on the principal surface of the substrate so as to be electrically connected to a semiconductor device chip to be located on the principal surface. A plurality of metallized pads are formed on the bottom surface and electrically connected to the patterned metallized conductors. A metal film is deposited so as to cover the bottom surface including the metallized pads, and a lead pin is soldered on the metal film above each metallized pad by a solder material. The lead pin is electroplated by applying a voltage to the metal film.

TITLE: Method for **electroplating** the lead pins of a **semiconductor** device pin grid **array** package

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=> s electrode# (p) arrary# (p) electroplate?

```
     214294 ELECTRODE#
         69 ARRARY#
       7294 ELECTROPLATE?
L1        0 ELECTRODE# (P) ARRARY# (P) ELECTROPLATE?
```

=> s electrode# (p) array# (p) electroplate?

```
     214294 ELECTRODE#
     187353 ARRAY#
       7294 ELECTROPLATE?
L2       28 ELECTRODE# (P) ARRAY# (P) ELECTROPLATE?
```

=> s electrode# (7a) array# (p) electroplate?

```
     214294 ELECTRODE#
     187353 ARRAY#
       7294 ELECTROPLATE?
L3       13 ELECTRODE# (7A) ARRAY# (P) ELECTROPLATE?
```

=> d 1-13

1. 5,672,878, Sep. 30, 1997, Ionization chamber having off-passageway measuring electrodes; Jonathan Yi Yao, 250/385.1 [IMAGE AVAILABLE]

2. 5,671,752, Sep. 30, 1997, Diaphragm electromyography analysis method and system; Christer Sinderby, et al., 600/546 [IMAGE AVAILABLE]

3. 5,556,530, Sep. 17, 1996, Flat panel display having improved electrode array; Walter Finkelstein, et al., 205/122, 123, 157, 205, 210, 219, 640, 666, 915; 216/79, 99 [IMAGE AVAILABLE]

4. 5,450,103, Sep. 12, 1995, Charge imaging system with back electrode dot enhancement; Igor Kubelik, 347/123; 346/135.1; 347/127, 139 [IMAGE AVAILABLE]

5. 4,821,279, Apr. 11, 1989, Gas laser; William E. Bell, 372/61, 34, 62, 66, 67, 87 [IMAGE AVAILABLE]

6. 4,701,767, Oct. 20, 1987, Magnetic recording head and method for manufacturing; Motomasa Imai, et al., 346/74.2, 74.5; 360/122 [IMAGE AVAILABLE]

7. 4,462,658, Jul. 31, 1984, Optical scanner; Donald R. Scifres, et al., 385/8, 10 [IMAGE AVAILABLE]

8. 4,415,403, Nov. 15, 1983, Method of fabricating an electrostatic print head; Joseph J. Bakewell, 216/27, 18, 47, 48, 97; 346/139C; 347/148 [IMAGE AVAILABLE]

9. 4,402,000, Aug. 30, 1983, Electrographic recording method and apparatus with control of toner quantity at recording region; George W. Fabel, et al., 347/55, 151 [IMAGE AVAILABLE]

10. 4,360,921, Nov. 23, 1982, Monolithic laser scanning device; Donald R. Scifres, et al., 372/50, 24; 385/14, 49 [IMAGE AVAILABLE]

11. 4,244,788, Jan. 13, 1981, Transducer-plated magnetically anisotropic metallic recording films, and associated techniques; John P. Faulkner, 360/133; 205/50, 90 [IMAGE AVAILABLE]

12. 3,968,360, Jul. 6, 1976, High resolution photoconductive array and process for fabricating same; Milton H. Monnier, 250/214.1, 214SG; 338/17, 18; 427/74; 438/73, 95 [IMAGE AVAILABLE]

13. 3,674,667, Jul. 4, 197[illegible]CESS FOR INCREASING WATER REPELLENCY OF
COTTON CLOTH; Jean P. Manion, et al., 204/165; 8/120; 204/169; 427/485, 525 [IMAGE AVAILABLE]

=> d cit ab kwic 1-

1. 5,672,878, Sep. 30, 1997, Ionization chamber having off-passageway measuring electrodes; Jonathan Yi Yao, 250/385.1 [IMAGE AVAILABLE]

US PAT NO:
5,672,878 [IMAGE AVAILABLE] L3: 1 of 13

ABSTRACT:
An ionization chamber for monitoring a radiation beam includes a housing having a primary beam passageway and a number of secondary beam cells that are adjacent to the primary beam passageway. The primary beam passageway passes entirely through the housing. In the preferred embodiment, a large-area beam measuring electrode and an array of small-area beam measuring electrodes are each coaxial with the primary beam passageway. Also, in the preferred embodiment, each secondary beam cell includes a beam measuring electrode. Because the portions of the radiation beam that enter the secondary beam cells do not pass through the ionization chamber, these portions do not contaminate the treatment beam, allowing the beam measuring electrodes within the cells to be dimensioned and configured so as to maximize signal strength.

DETDESC:

DETD(20)

On . . . is a patterned high voltage electrode 108 that is formed of a patterned gold layer. An acceptable layer is an **electroplated** gold layer having a thickness of approximately 200 nm. While not critical, the high voltage electrode 108 may have a diameter that is approximately equal to the diameter of the **array** 58 of small-area **electrodes** 60, 62, 64 and 66.

DETDESC:

DETD(21)

Below . . . is not adhered to a film. In comparison, a lower ring 112 has an attached film 114 that supports the **array** 58 of small-area beam measuring **electrodes** directly below the high voltage electrode 108. A top view of the film 114 is shown in FIG. 4. A layer of **electroplated** gold is patterned to form the four small-area electrodes 60, 62, 64 and 66 and to form leads 116, 118,. . .

2. 5,671,752, Sep. 30, 1997, Diaphragm electromyography analysis method and system; Christer Sinderby, et al., 600/546 [IMAGE AVAILABLE]

US PAT NO: 5,671,752 [IMAGE AVAILABLE] L3: 2 of 13

ABSTRACT:
In the method and system for electromyographic analysis of a striated muscle, electromyographic signals produced by the muscle are detected by means of an array of electrodes passing through the center of the muscle depolarizing region. Each electromyographic signal comprises an electromyographic component and a noise component. The position of the center of the muscle depolarizing region is then determined by detecting a reversal of polarity of the electromyographic components of the signals. Finally, two signals of opposite polarities amongst the electromyographic signals are subtracted. The subtraction subtracts the noise components of the two signals from each other but adds the electromyographic components of the two signals together to produce an electromyographic signal of improved signal-to-noise ratio. Advantageously, the array of electrodes is a linear array of successive electrodes, the center of the muscle depolarizing region is located between the electrodes of a given pair of successive electrodes, and the two signals of opposite polarities detected through the two pairs of successive electrodes adjacent to the given pair on opposite sides thereof are subtracted.

CLAIMS:

CLMS(11)

11. A system for producing an electromyographic signal having an improved signal-to-noise ratio as recited in claim 3, wherein said

array of **electrodes** is mounted on a free end s[illegible] of a catheter, and wherein each of said electrodes comprises [illegible]llic wire wound around the catheter, said wound metallic wire presenting a rough surface first smoothed by solder, and then **electroplated**.

3. 5,556,530, Sep. 17, 1996, Flat panel display having improved electrode array; Walter Finkelstein, et al., 205/122, 123, 157, 205, 210, 219, 640, 666, 915; 216/79, 99 [IMAGE AVAILABLE]

US PAT NO: 5,556,530 [IMAGE AVAILABLE] L3: 3 of 13

ABSTRACT:
An **array** of **electrodes** for use in a flat panel display includes a plurality of electron emitters formed of polycrystalline or single crystalline silicon which has been selectively etched to form pores in the emitters. The **electrode** **array** is then **electroplated** in a methane plasma to deposit a carbon compound such as silicon carbide on the surfaces of the emitters and in the pores of the emitters. Each emitter has a generally flat electron emitting surface which facilitates a longer life for the **electrode** **array**, the porous structure of the emitters increasing the electron emission efficiency of the emitters in relatively low electric fields. The **electrode** **array** can be integral with a support substrate by anisotropically etching the substrate to form the emitters. A layered interconnect structure can be formed on a surface of the silicon substrate for providing the interconnect structure for the **electrode** **array**.

ABSTRACT:
An **array** of **electrodes** for use in a flat panel display includes a plurality of electron emitters formed of polycrystalline or single crystalline silicon which has been selectively etched to form pores in the emitters. The **electrode** **array** is then **electroplated** in a methane plasma to deposit a carbon compound such as silicon carbide on the surfaces of the emitters and. . . pores of the emitters. Each emitter has a generally flat electron emitting surface which facilitates a longer life for the **electrode** **array**, the porous structure of the emitters increasing the electron emission efficiency of the emitters in relatively low electric fields. The **electrode** **array** can be integral with a support substrate by anisotropically etching the substrate to form the emitters. A layered interconnect structure can be formed on a surface of the silicon substrate for providing the interconnect structure for the **electrode** **array**.

SUMMARY:

BSUM(7)

In accordance with the invention, an **electrode** **array** for a flat panel display and the like comprises a supporting substrate with a plurality of electrodes extending from the. . . be formed by selectively electrolytically etching the silicon body in a hydrofluoric acid, and the carbon compound film can be **electroplated** on the **array** of **electrodes** in a methane gas plasma which forms a coating including silicon carbide.

4. 5,450,103, Sep. 12, 1995, Charge imaging system with back electrode dot enhancement; Igor Kubelik, 347/123; 346/135.1; 347/127, 139 [IMAGE AVAILABLE]

US PAT NO: 5,450,103 [IMAGE AVAILABLE] L3: 4 of 13

ABSTRACT:
An electrographic printing system moves a dielectric imaging member past a charge transfer print cartridge or bulk charging source, and a landing electrode arrangement directs charged particles with enhanced precision to dot positions on the imaging member. The arrangement includes a central, point-like, target electrode and a field electrode that, together with the target electrode, provides a corrective electric field component to form a focusing, or at least a non-diverging field over the target position. Field deflection artifacts such as "venetian blinding" are substantially corrected. The target electrodes are located behind the imaging member, in registry with the charging cartridge which is opposed to the other side of the member. Different landing electrode arrangements may include one- or two-dimensional arrays of targeting electrodes and are adapted to either bulk or pointwise arrays of charge emitter. Two dimensional imaging may be performed by timed actuation of landing electrodes using a charged particle source that is always ON, by multiplexing the print cartridge electrodes, or multiplexing some electrodes of each of the two structures at a lower rate. A self-limiting feedback loop assures charge dot saturation without image distortion.

DETDESC:

DETD(23)

In a preferred form of construction, the provision of a large two dimensional **array** of small **electrodes** 9 is achieved by using thin film microlithographic techniques to form conductive pattern features. One such array 200 is illustrated. . . resist 205 is then formed over the filled areas of each target electrode region, and a metallization layer 206 is **electroplated** over the surface, forming field electrodes 8, and extending the tip 9a with a metal crown 9b so it is flush with the surface. As will be readily understood, **electrodes** may be laid down as an **array** of individual or group **electrodes**, thus requiring several steps of resist coating exposure, pattern etching, metal deposition and resist removal, or may be laid down. . . into access leads, split electrodes, and the like. Variations of the foregoing procedure are readily adapted to produce the illustrated **electrode** **array** structures.

DETDESC:

DETD(24)

FIGS. . . . layer 12 having through-openings corresponding to the intended dot positions, and individual conductive posts or through-electrodes 9 are deposited e.g., **electroplated** through the openings in layer 12 to contact the sheet 9a. This provides a structure of central electrodes 9 all. . . and placed behind member 3 to provide the desired centering and focusing of charge onto precise areas above the landing **electrodes** 9, the **array** 50 operates as a passive device to locate and densify charge which has been generated by the print cartridge, concentrating. . .

5. 4,821,279, Apr. 11, 1989, Gas laser; William E. Bell, 372/61, 34, 62, 66, 67, 87 [IMAGE AVAILABLE]

US PAT NO: 4,821,279 [IMAGE AVAILABLE] L3: 5 of 13

ABSTRACT:
In a gas ion laser of the type having a serial **array** of coaxially aligned axially spaced floating **electrodes** contained within an evacuable dielectric envelope for exciting a d.c. plasma laser pumping discharge, the electrodes and gas fill are cooled by a plurality of axially directed coolant tubes within the gas-filled envelope. The electrodes have a spherically shaped funnel portion immediately surrounding the laser beam and plasma discharge path for focusing secondary electrons back into the beam path for increasing conversion efficiency. The spherically shaped surfaces are **electroplated** with a tungsten-cobalt alloy to decrease sputter erosion.

ABSTRACT:
In a gas ion laser of the type having a serial **array** of coaxially aligned axially spaced floating **electrodes** contained within an evacuable dielectric envelope for exciting a d.c. plasma laser pumping discharge, the electrodes and gas fill are. . . discharge path for focusing secondary electrons back into the beam path for increasing conversion efficiency. The spherically shaped surfaces are **electroplated** with a tungsten-cobalt alloy to decrease sputter erosion.

6. 4,701,767, Oct. 20, 1987, Magnetic recording head and method for manufacturing; Motomasa Imai, et al., 346/74.2, 74.5; 360/122 [IMAGE AVAILABLE]

US PAT NO: 4,701,767 [IMAGE AVAILABLE] L3: 6 of 13

ABSTRACT:
A method is disclosed which manufactures a recording head adapted to be moved relative to a recording medium, which is comprised of a conductive substrate and dielectric layer formed on the conductive substrate, to permit data to be recorded on the recording medium with the use of a conductive/magnetic toner on the recording medium. A conductive/magnetic sheet is attached to an insulating substrate of a first size with an adhesive layer therebetween, the first size of the insulating substrate is greater than a second size thereof defined by an insulating substrate of a finally completed recording head. The conductive/magnetic sheet is selectively etched to form an array of slits at a predetermined interval with both ends of the slits located beyond the side edges of an insulating substrate of a finally completed recording head. At one side edge portion of the conductive/magnetic sheet the conductive/magnetic sheet is **electroplated** to form a plated layer for a bonding pad. Those areas of the conductive/magnetic sheet, plated layer and insulating substrate, which are located beyond the side edge of the insulating

substrate of the finally completed recording head, are c[illegible]rm a parallel **array** of **electrodes** and a bonding pad [illegible] side edge portion of the conductive/magnetic electrodes.

ABSTRACT:

A . . . substrate of a finally completed recording head. At one side edge portion of the conductive/magnetic sheet the conductive/magnetic sheet is **electroplated** to form a plated layer for a bonding pad. Those areas of the conductive/magnetic sheet, plated layer and insulating substrate,. . . beyond the side edge of the insulating substrate of the finally completed recording head, are cut to form a parallel **array** of **electrodes** and a bonding pad on one side edge portion of the conductive/magnetic electrodes.

7. 4,462,658, Jul. 31, 1984, Optical scanner; Donald R. Scifres, et al., 385/8, 10 [IMAGE AVAILABLE]

US PAT NO: 4,462,658 [IMAGE AVAILABLE] L3: 7 of 13

ABSTRACT:

An optical scanner with a thin waveguide medium on a substrate includes means to couple a wide collimated beam of radiation into one end of the medium. A periodic array of substantially parallel, spaced electrodes are associated with one major surface of the medium. At least a portion of their electrode lengths extend in a direction substantially parallel with the direction of radiation propagating through the medium. Supply means is provided to apply voltages in a pattern to the electrodes which varies from one electrode to the next adjacent electrode to a predetermined value over several of the electrodes and the same pattern of voltages or a similar pattern of different voltages is applied over several of the next adjacent electrodes up to the predetermined value. In this manner, the pattern is completed across the electrode array to produce a corresponding approximation of a desired phase retardation along a phase front of the propagating radiation in the medium. Further means is employed to change the magnitude of the applied voltages across the electrode array to vary the approximation of the phase retardation to cause the radiation beam to scan in a direction of radiation propagation in the medium.

DETDESC:

DETD(16)

As . . . 44 is positioned on the surface 17 of waveguide layer 16. The chip 44 is fabricated by VLSI techniques. An **array** of **electrodes** 42 are deposited on the surface 17 of the waveguide layer 16 across its entire width. The electrodes 42 may be evaporated, **electroplated** or otherwise deposited on surface 17. Employing selective masking, each electrode is properly coupled at its extended end portion 45. . .

8. 4,415,403, Nov. 15, 1983, Method of fabricating an electrostatic print head; Joseph J. Bakewell, 216/27, 18, 47, 48, 97; 346/139C; 347/148 [IMAGE AVAILABLE]

US PAT NO: 4,415,403 [IMAGE AVAILABLE] L3: 8 of 13

ABSTRACT:

An electrostatic print head and method of fabrication therefor in which a head is provided having a precision high resolution array of styli of intended cross-section and an interconnect pattern for simple connection to driving circuits. A planar thin film pattern of spaced metal electrode lines is provided by photolithographic and electroforming techniques on one surface of a glass or ceramic substrate, and a spaced array of planar thin film buss lines are similarly formed on the opposite surface. The electrode lines and buss lines are formed by vacuum deposition of a metal onto the substrate surfaces, etching into intended patterns, and electroforming to the required thickness and cross-sections. Electronic components can be provided in film form on the same substrate as the electrode lines.

SUMMARY:

BSUM(10)

In . . . chromium overlayed with copper. After the vacuum deposition of chromium and copper, a thin layer of metal, typically copper, is **electroplated** over the chromium copper surfaces of the substrate and the metal-coated holes. A photoresist pattern is then formed on one surface of the substrate to provide an intended **array** of **electrode** lines and pad areas in alignment with respective pad areas of the **electrode** **array**.

DETDESC:

DETD(6)

The . . . good adherence to the glass surfaces, overlayed with a thin layer of copper. A thin layer of copper is then **electroplated** over the chromium and copper substrate surfaces and holes. A photoresist pattern is formed and processed by well-known techniques on one surface of the substrate to produce the **array** of **electrode** lines 14 and pad areas 44. A photoresist pattern is also provided on the opposite substrate surface to produce the. . . of buss lines 22 and pad areas 46. The exposed copper surfaces defined by means of the photoresist patterns are **electroplated** with a layer of nickel. The connector areas of the buss lines 22 can be gold-plated to provide high conductivity. . .

9. 4,402,000, Aug. 30, 1983, Electrographic recording method and apparatus with control of toner quantity at recording region; George W. Fabel, et al., 347/55, 151 [IMAGE AVAILABLE]

US PAT NO: 4,402,000 [IMAGE AVAILABLE] L3: 9 of 13

ABSTRACT:

An electrographic method and apparatus are provided for maintaining a controlled quantity of electronically conductive toner in the recording region formed between an array of stylus electrodes and a receptor recording member. A regular or relatively uniform supply of toner is provided to said recording region where a temporally constant force is presented which acts on the toner to establish an electronically conductive path via the toner between the electrodes and the recording member. Recording electrical potential signals selectively applied to the first electrodes relative to the recording member cause toner to be deposited on the recording member as image toner. A toner removal means provides a temporally constant force for removing excess accumulated toner from said recording gap to a point where it is out of electronic contact with the toner at the recording gap. Non-image toner removal means positioned at a point remote from the recording region is also disclosed.

DETDESC:

DETD(20)

A variety of materials and constructions can be utilized in the fabrication of styli **electrode** **arrays** including iron wire, nickel wire, etched lines in thin film metals, electroformed nickel lines, **electroplated** etched circuits, laminates of metal and insulator and others. When magnetic forces are used, using magnetically permeable materials for the. . .

10. 4,360,921, Nov. 23, 1982, Monolithic laser scanning device; Donald R. Scifres, et al., 372/50, 24; 385/14, 49 [IMAGE AVAILABLE]

US PAT NO: 4,360,921 [IMAGE AVAILABLE] L3: 10 of 13

ABSTRACT:

A monolithic laser scanning device includes a semiconductor laser region integral with but spaced from an optical scanning region. These regions are optically coupled which may include a continuous transparent or passive waveguide medium. The periodic array of substantially parallel spaced electrodes are associated with the waveguide medium in the optical scanning region. The electrodes extend in the same direction as the propagating radiation in the medium. The voltages are applied in a pattern to the electrodes which voltages vary from one electrode to the next adjacent electrode to a predetermined value over several of the electrodes. The same pattern of voltages or a similar pattern of different voltages is applied over several of the next adjacent electrodes to the predetermined value until the pattern is completed across the electrode array to produce a corresponding approximation of a desired phase retardation along the phase front of the propagating radiation. By changing the magnitude of the applied voltages across the electrodes, the approximation of the front phase retardation may be varied and the phase front of the propagating radiation may be continuously varied to cause the radiation to scan in a direction transverse to the direction of the propagating radiation in the medium.

DETDESC:

DETD(16)

As . . . 44 is positioned on the surface 17 of waveguide layer 16.

The chip 44 is fabricated by VLSI techniques. An **arr[illegible]f **electrodes** 42 are deposited on the surface 17 of the[illegible]guide layer 16 across its entire width. The electrodes 42 may be evaporated, **electroplated** or otherwise deposited on surface 17. Employing selective masking, each electrode is properly coupled at its extended end portion 45. . .

11. 4,244,788, Jan. 13, 1981, Transducer-plated magnetically anisotropic metallic recording films, and associated techniques; John P. Faulkner, 360/133; 205/50, 90 [IMAGE AVAILABLE]

US PAT NO: 4,244,788 [IMAGE AVAILABLE] L3: 11 of 13

ABSTRACT:
Described are thin magnetic recording films having "uniaxial anistropy" which are deposited using a magnetic plating head and plating anode, both disposed in cooperative relation adjacent the substrate-cathode, to comprise a "plating transducer". This transducer may be translated across the substrate and so sweep the "magnetic-gap" field thereacross as to align the plated material while it is being deposited.

CLAIMS:

CLMS(1)

What . . .

including a prescribed substrate and a magnetic recording film applied thereon by a "mag-trode" array in a plating arrangement, this **array** including plating **electrode** means arranged to **electroplate** on a prescribed zone of said record and, in operative combination with said plating means, magnetic circuit means adapted to. . .

CLAIMS:

CLMS(22)

22. . . . of plating thin magnetic recording films on a prescribed substrate comprising:
providing a "mag-trode" array in a plating arrangement, this **array** including plating **electrode** means arranged to **electroplate** on a prescribed substrate zone and, in operative combination with said plating means, magnetic circuit means adapted to project a. . .

12. 3,968,360, Jul. 6, 1976, High resolution photoconductive array and process for fabricating same; Milton H. Monnier, 250/214.1, 214SG; 338/17, 18; 427/74; 438/73, 95 [IMAGE AVAILABLE]

US PAT NO: 3,968,360 [IMAGE AVAILABLE] L3: 12 of 13

ABSTRACT:
Disclosed is a novel photoconductive array suitable for use as an infrared detector, and a novel process for fabricating same. In this process, a chosen metallization pattern is disposited on the surface of an insulating substrate, and thereafter the metallization pattern is either covered or partially covered with a layer of selected photoconductive material, such as lead selenide or lead sulfide. The photoconductive material is formed into a predetermined pattern which is accomplished using conventional photoetch techniques. Then, a suitable photoresist mask is deposited at a selected location on the surface of the photoconductive layer in preparation for an electroplating step. In this electroplating step, a surface contact metallization for the photoconductor is plated on both the previously deposited photoconductive and metal surfaces which are not masked by the photoresist. This electroplated contact metallization for the photoconductor exhibits excellent adherence to the somewhat rough surface of the photoconductive material, and the present process exhibits an improved geometry reduction capability relative to prior art processes.

DETDESC:

DETD(4)

The . . . which electrical contacts 20 and 22 are firmly adhered and separated by a distance L as shown. In one such **array** which I have fabricated, the surface **electrode** pattern 20, 22 of gold was **electroplated** using a neutral plating solution of "Pure-a-gold 125" sold by the Sel-Rex Corporation of Nutley, New Jersey.

13. 3,674,667, Jul. 4, 1972, PROCESS FOR INCREASING WATER REPELLENCY OF
COTTON CLOTH; Jean P. Manion, et al., 204/165; 8/120; 204/169; 427/485,
525 [IMAGE AVAILABL[illegible]

US PAT NO: 3,674,667 [IMAGE AVAILABLE] L3: 13 of 13

ABSTRACT:
A manufactured material and a process for making the material is disclosed. The manufactured material is a hydrogen containing substance having a fluorinated surface and in which hydrogen atoms, which may be present in hydroxyl radicals attached to a carbon atom chain, have been replaced in the surface of the material by fluorine atoms or radicals, and with such fluorinated surface of the material containing at least about 2 micrograms of such fluorine per cm.sup.2 of surface area. The process for making such a material includes the steps of selecting a substrate containing hydrogen atoms which may be present in hydroxyl radicals attached to a carbon atom chain, selecting a gas containing fluorine atoms or radicals, placing the selected substrate between electrodes in a flowing atmosphere of the selected gas at subatmospheric pressure, and subjecting the substrate to an electrodeless discharge of at least about 0.2 KWH/yard.sup.2 to chemically activate both the surface of the substrate and the gas, and exchange the fluorine atoms or radicals for surface hydrogen atoms or radicals to produce a material with a surface, which compared to the substrate before this process treatment, is more water repellent (without sealing pores), is more corrosion and soil resistant, more chemically inert, and more like the relatively expensive polytetrafluoro-ethylene. When the substrate is a material having a relatively inert surface, such as polyethylene, the process is disclosed as including an initial treatment step that involves ion bombardment of the substrate in helium gas to activate the surface before the surface is treated in the fluorine containing gas.

DETDESC:

DETD(3)

Each . . . mm outside diameter, and contains a filament 21 which may be a wire, a roll of metal foil or an **electroplated** metallic deposite on the inner surface of the tube. Each **electrode** of the upper **electrode** **array** 8 is connected electrically in parallel as were the **electrodes** of the lower **array** 9. Power was connected at **electrodes** 8a and 9a. The power source used (not shown) was a Lepel Model T-2.5-1-KC-M-S high frequency induction heating unit which. . .

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L1         1556 PHOTOCOPIER#

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L2          425 L1 AND POTENTIAL

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'?' TRUNCATION SYMBOL NOT VALID WITHIN 'ELECTRO?POTENTIAL'

=> s l1 and electrostatic

         64990 ELECTROSTATIC
L3         547 L1 AND ELECTROSTATIC

=> s l1 and electrostatic (5a) paper  and pattern#

         64990 ELECTROSTATIC
        260631 PAPER
          2733 ELECTROSTATIC (5A) PAPER
        362684 PATTERN#
L4          36 L1 AND ELECTROSTATIC (5A) PAPER  AND PATTERN#

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=> s l1 and electrostatic (5a) paper (p) pattern#

         64990 ELECTROSTATIC
        260631 PAPER
        362684 PATTERN#
           182 ELECTROSTATIC (5A) PAPER (P) PATTERN#
L5           3 L1 AND ELECTROSTATIC (5A) PAPER (P) PATTERN#

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1. 5,215,842, Jun. 1, 1993, Photosensitive element for electrophotography; Sukekazu Aratani, et al., 430/59; 399/159; 430/73 [IMAGE AVAILABLE]

US PAT NO: 5,215,842 [IMAGE AVAILABLE]   L5: 1 of 3

ABSTRACT:
A photosensitive element for electrophotography has an electrically conductive substrate and a layer structure thereon comprising a charge generating substance and a charge transport substance. An improved charge transport substance is a derivative of triphenylamine in which at least 80% of the electrons in the highest occupied molecular orbital are located on the triphenylamine skeleton. Examples of such compounds have the following formula: ##STR1## wherein X is a an optionally substituted heterocyclic radical containing at least one ring nitrogen, Q is a single bond or --C.dbd.C--, and Z.sub.1, Z.sub.2 and Z.sub.3 are H, lower alkyl or alkoxy, aryl, NO.sub.2, CF.sub.3, --N(R').sub.2, --S--C.sub.6 H.sub.5 or --S(R').sub.2.

SUMMARY:

BSUM(2)

The . . . drum or sheet, and to an electrophotographic apparatus including such an element, particularly an image forming device such as a **photocopier**, a laser printer and a facsimile-transmitting machine.

DETDESC:

DETD(17)

Electrophotographical characteristics of this photosensitive element were measured with an apparatus for testing of **electrostatic** recording **paper** (SP-428 type made by Kawaguchi Electric Co.). The measurement included 10 seconds corona charging of -5 kV (the dynamic mode),. . . of 180.degree. from the corona charger was repeated for three hours. Subsequently, a resolution was evaluated by observing a resolution **pattern** which was obtained by contact exposure and development of a test chart published by the Society of Electrophotography (Tokyo) (No.. . .

2. 4,318,608, Mar. 9, 1982, Portable electrostatic **photocopier**; John M. Payne, 399/89, 196 [IMAGE AVAILABLE]

US PAT NO: 4,318,608 [IMAGE AVAILABLE]   L5: 2 of 3

ABSTRACT:
The development of a compact non-electrical mains supply based **photocopier** is described in which a piezo-electric crystal generator

or a battery operated capacitor discharge circuit EHT supply is employed for generating the high voltage for charging the photoreceptive paper. The EHT supply for charging the paper is additionally used to provide the source of power for the light source (typically one or more fluorescent gas discharge tubes).
The **photocopier** incorporates all the facilities to charge and subsequently apply toner and fix the latter in place, with a light-proof housing.
TITLE: Portable electrostatic **photocopier**

ABSTRACT:
The development of a compact non-electrical mains supply based **photocopier** is described in which a piezo-electric crystal generator or a battery operated capacitor discharge circuit EHT supply is employed for. . . additionally used to provide the source of power for the light source (typically one or more fluorescent gas discharge tubes). The **photocopier** incorporates all the facilities to charge and subsequently apply toner and fix the latter in place, with a light-proof housing.

SUMMARY:

BSUM(4)

The . . . will be less dissipated or not dissipated at all in areas which are less brightly lit or are dark. The **paper** containing the **electrostatic** charge **pattern** can then be placed in a solution of carbon black and dispersant or carbon powder can be cascaded over the. . .

SUMMARY:

BSUM(8)

With . . . object of the present invention to provide a method and apparatus of photocopying which is of general application to all **photocopiers** but is of particular application to an apparatus incorporating the minimum of moving parts by which photocopies of flat documents. . .

3. 4,258,095, Mar. 24, 1981, Reduced gloss in pressure-fixing of toner powder; Roger L. Larson, et al., 428/172; 118/44, 115, 116; 399/324, 339; 427/194, 278, 469, 494; 430/98 [IMAGE AVAILABLE]

US PAT NO: 4,258,095 [IMAGE AVAILABLE] L5: 3 of 3

ABSTRACT:
A novel apparatus and method for pressure fixing imaging powder to a receptor (such as paper) to produce photocopies having reduced gloss is provided. The apparatus comprises non-compliant pressure members (e.g., pressure rollers) one of which has a surface of defined texture or roughness. An offset prevention material is applied to the textured pressure member such that offset of imaging powder from a receptor passing between the pressure members to the textured pressure member is essentially prevented.

SUMMARY:

BSUM(3)

Electrostatic . . . of visible light, exposing the charged member to selectively reflected visible light to create thereon a latent (i.e., invisible) charge **pattern** comprising electrostatically charged areas on a discharged background, developing the latent charge **pattern** with visible electroscopic imaging powder (known in the art as "toner") which is electrostatically attracted to the charged areas of the **pattern**, and permanently fixing the electroscopic powder. In the so called, "transfer process" a permanent photo-dischargeable member is employed, the developed charge **pattern** (i.e., the electrostatically attracted toner) being transferred to an expendable substrate, e.g. paper, before the toner is fixed. In the "direct process", the photo-dischargeable member comprises an expendable **electrostatic** copy **paper**, the toner being permanently affixed to the copy paper without transfer. The present invention provides a method and apparatus for. . .

DETDESC:

DETD(14)

It . . . preferably have a melting or softening temperature above the highest ambient temperature to which the materials are exposed in the photocopier. Secondly, solid toner offsetting materials should be capable of forming a continuous layer when deposited onto the matte surfaced pressure. . .

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    178516 ARRAY
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L3     199 L1 AND ARRAY (5A) ELECTRODE#

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1. 5,835,458, Nov. 10, 1998, Solid state optical data reader using an
electric field for routing control; William K. Bischel, et al.,
369/44.12, 44.23, 44.28, 44.29, 112 [IMAGE AVAILABLE]

2. 5,835,293, Nov. 10, 1998, Array of thin film actuated mirrors for use
in an optical projection system and method for the manufacture thereof;
Yong-Ki Min, et al., 359/850, 214, 221, 224, 295, 871, 872, 873, 876
[IMAGE AVAILABLE]

3. 5,834,321, Nov. 10, 1998, Low noise address line repair method for
thin film imager devices; Roger Stephen Salisbury, 438/4, 98, 690, 761
[IMAGE AVAILABLE]

4. 5,833,826, Nov. 10, 1998, Method and apparatus for reducing the
distortion of a sample zone eluting from a capillary electrophoresis
capillary; Eric S. Nordman, 204/452, 451, 601, 603 [IMAGE AVAILABLE]

5. 5,831,588, Nov. 3, 1998, DC integrating display driver employing
pixel status memories; Robert Hotto, 345/100, 98 [IMAGE AVAILABLE]

=> s 435/clas

L4    43748 435/CLAS

=> s 436/clas

L5    18837 436/CLAS

=> s 530/clas or 536/clas

     21748 530/CLAS
     22936 536/CLAS
L6    42480 530/CLAS OR 536/CLAS

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L7    83310 (L4 OR L5 OR L6)
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L4 43748 S 435/CLAS
L5 18837 S 436/CLAS
L6 42480 S 530/CLAS OR 536/CLAS
L7 83310 S L4-L6

=> s l3 and l7

L8 18 L3 AND L7

=> d 1-18

1. 5,728,532, Mar. 17, 1998, Electrode configuration for matrix addressing of a molecular detection device; Donald E. Ackley, **435/6**; 422/50, 68.1, 81, 82; **435/5**, **7.1**, **7.2**, **7.9**, **91.1**, **91.5**, **292.1**, **299.1**, **808**, **814**; **436/182**, **501**, **518**, **524**, **525**, **528**; **536/24.3**, **24.32**, **24.33** [IMAGE AVAILABLE]

2. 5,720,928, Feb. 24, 1998, Image processing and analysis of individual nucleic acid molecules; David C. Schwartz, 422/186, 55, 58, 99, 129; **435/6** [IMAGE AVAILABLE]

3. 5,677,195, Oct. 14, 1997, **Combinatorial** strategies for polymer **synthesis**; James L. Winkler, et al., **436/518**; 422/134, 149; **435/6**, **7.92**, **970**, **973**; **436/89**, **527**, **528**; **530/333**, **334**, **335**; **536/25.3**, **25.31**, **25.32** [IMAGE AVAILABLE]

4. 5,674,743, Oct. 7, 1997, Methods and apparatus for DNA sequencing; Kevin M. Ulmer, **435/287.2**; 422/82.08; **435/288.7**; **436/94**, **172** [IMAGE AVAILABLE]

5. 5,653,939, Aug. 5, 1997, Optical and electrical methods and apparatus for molecule detection; Mark A. Hollis, et al., 422/50; 204/456; 422/68.1, 76, 82.01, 82.02, 82.05, 91; **435/5**, **6**, **7.1**, **7.9**, **285.2**; **436/149**, **150**, **806**, **807**; **530/300**, **333**, **350** [IMAGE AVAILABLE]

6. 5,632,957, May 27, 1997, Molecular biological diagnostic systems including electrodes; Michael J. Heller, et al., 422/68.1, 50, 52, 55, 56, 61, 62, 63, 67, 69, 81, 82.01, 82.02, 82.03, 82.04, 82.05; **435/6**, **7.1**, **173.1**; **436/501**; **536/22.1**, **23.1**, **24.1** [IMAGE AVAILABLE]

7. 5,622,872, Apr. 22, 1997, Analyte detection through observed optical modulation of polymerized lipid layers; Hans O. Ribi, **436/518**; 204/403; 422/82.08, 82.09; **435/7.1**, **7.5**, **288.7**; **436/532** [IMAGE AVAILABLE]

8. 5,605,662, Feb. 25, 1997, Active programmable electronic devices for molecular biological analysis and diagnostics; Michael J. Heller, et al., 422/68.1; 204/600, 601; 257/414; 422/50, 55, 56, 57, 58, 63, 69, 82.01, 82.02, 82.05, 82.06, 82.07, 82.08, 82.09, 129, 131, 138; **435/6**, **7.1**, **90**, **91.1**, **91.2**, **91.3**, **91.5**, **91.51**, **173.1**, **174**, **176**, **177**, **283.1**, **285.1**, **285.2**, **287.1**, **287.2**, **287.3**, **287.7**, **287.8**, **287.9**, **288.7**, **290.1**, **292.1**, **299.1**, **808**, **814**; **436/63**, **164**, **165**, **166**, **169**, **172**, **175**, **501**, **518**, **524**, **525**, **528**, **531**, **532**, **535**, **805**; 438/49 [IMAGE AVAILABLE]

9. 5,510,481, Apr. 23, 1996, Self-assembled molecular films incorporating a ligand; Mark D. Bednarski, et al., **536/120**; 106/287.12, 287.13; 428/447, 448; **536/1.11**, **4.1**, **18.4**, **18.5**, **18.6**, **122** [IMAGE AVAILABLE]

10. 5,491,097, Feb. 13, 1996, Analyte detection with multilayered bioelectronic conductivity sensors; Hans O. Ribi, et al., **436/518**; 422/82.01, 82.02, 82.03, 82.06; **435/7.1**, **7.5**, **7.92**; **436/501**, **527**, **5 **806** [IMAGE AVAILABLE]

11. 5,401,378, Mar. 28, 1995, Ionic reservoir at electrode surface; Lionel G. King, et al., 204/418, 403; 205/778; 422/82.03; **435/817** [IMAGE AVAILABLE]

12. 5,384,261, Jan. 24, 1995, Very large scale immobilized polymer synthesis using mechanically directed flow paths; James L. Winkler, et al., **436/518**; 422/134, 149; **435/7.1**, **968**, **969**, **970**, **973**; **436/501**, **527**, **531**, **532**, **807**, **809**; **530/334**, **335**, **337** [IMAGE AVAILABLE]

13. 5,234,566, Aug. 10, 1993, Sensitivity and selectivity of ion channel biosensor membranes; Peter D. J. Osman, et al., 204/403, 416, 418, 426; **435/817**; **436/806** [IMAGE AVAILABLE]

14. 5,156,810, Oct. 20, 1992, Biosensors employing electrical, optical and mechanical signals; Hans O. Ribi, 422/82.01; 204/403; 422/82.02, 82.06; **435/287.2**, **287.9**; **436/501**, **527**, **531**, **806** [IMAGE AVAILABLE]

15. 5,145,565, Sep. 8, 1992, Contamination-free method and apparatus for measuring body fluid chemical parameters; John Kater, et al., 205/792; 204/400, 403, 416; 205/789; **436/8**, **809**; 604/318, 403, 410 [IMAGE AVAILABLE]

16. 5,071,770, Dec. 10, 1991, Method for gaseous component indentification with #3 polymeric film; Edward S. Kolesar, Jr., **436/151**; 204/406; 324/439; 422/83, 90, 98; **436/149** [IMAGE AVAILABLE]

17. 5,066,372, Nov. 19, 1991, Unitary multiple electrode sensor; Howard H. Weetall, 205/777.5; 204/403, 412; 205/337; **435/7.7**, **7.92**, **14**, **25**, **817**; **436/518**, **532**, **535**, **806** [IMAGE AVAILABLE]

18. 4,963,245, Oct. 16, 1990, Unitary multiple electrode sensor; Howard H. Weetall, 204/403, 412; **435/7.1**, **14**, **25**, **817**; **436/518**, **532**, **535**, **806** [IMAGE AVAILABLE]

=> s l8 and array (5a) electrodes

178516 ARRAY
154903 ELECTRODES
4332 ARRAY (5A) ELECTRODES
L9 11 L8 AND ARRAY (5A) ELECTRODES

=> d 1-11 cit ab kwic

1. 5,677,195, Oct. 14, 1997, **Combinatorial** strategies for polymer **synthesis**; James L. Winkler, et al., **436/518**; 422/134, 149; **435/6**, **7.92**, **970**, **973**; **436/89**, **527**, **528**; **530/333**, **334**, **335**; **536/25.3**, **25.31**, **25.32** [IMAGE AVAILABLE]

US PAT NO: 5,677,195 [IMAGE AVAILABLE] L9: 1 of 11

ABSTRACT:
A method and device for forming large arrays of polymers on a substrate (401). According to a preferred aspect of the invention, the substrate is contacted by a channel block (407) having channels (409) therein. Selected reagents are delivered through the channels, the substrate is rotated by a rotating stage (403), and the process is repeated to form arrays of polymers on the substrate. The method may be combined with light-directed methodolgies.
TITLE: **Combinatorial** strategies for polymer **synthesis**
US-CL-CURRENT: **436/518**; 422/134, 149; **435/6**, **7.92**, **970**, **973**; **436/89**, **527**, **528**; **530/333**, **334**, **335**; **536/25.3**, **25.31**, **25.32**

SUMMARY:

BSUM(5)

Some work has been done to automate **synthesis** of polymer **arrays**. For example, Southern, PCT Application No. WO 89/10977 describes the use of a conventional pen plotter to deposit three different. . . coupling at a number of reaction sites, into a different heterogenous array. This approach is referred to generally as a "**combinatorial**" **synthesis**.

DRAWING DESC:

DRWD(6)

FIG. . . . is a top view and FIG. 5b is a cross-sectional view of a first embodiment of a device used to **synthesize** **arrays** of polymer sequences;

DETDESC:

DETD(36)

As . . . formation of arrays of large numbers of different polymer sequences. According to a preferred embodiment, the invention provides for the **synthesis** of an **array** of different peptides or oligonucleotides in selected regions of a substrate. Such substrates having the diverse sequences formed thereon may. . .

DETDESC:

DETD(38)

In some embodiments, the present invention can be employed to localize and, in some cases, immobilize vast **collections** of **synthetic** **chemical** compounds or natural product extracts. In such methods, compounds are deposited on predefined regions of a substrate. The reaction of the immobilized compound (or compounds) with various test compositions such as the members of the **chemical** **library** or a biological extract are tested by dispensing small aliquots of each member of the library or extract to a. . .

DETDESC:

DETD(56)

FIG. . . . and BC have been formed using only two process steps. Accordingly, it is seen that the process provides for the **synthesis** of vast **arrays** of polymer sequences using only a relatively few process steps. By way of further example, it is necessary to use. . .

DETDESC:

DETD(68)

The . . . design shown in FIG. 7 provides for two separate channel blocks to be used in successive process steps during a **chemical** **synthesis**. One block forms a horizontal **array** on the solid substrate, while the other block forms a vertical array. To create a matrix of intersecting rows and. . .

DETDESC:

DETD(82)

In . . . embodiment, a collection of delivery lines such as a manifold or collection of tubes 1000 delivers activated reagents to a **synthesis** support matrix 1002. The **collection** of tubes 1000 may take the form of a rigid synthesis block manifold which can be precisely aligned with the. . .

DETDESC:

DETD(91)

According . . . the receptor binds. According to some embodiments, the channel block is used to direct solutions containing a receptor over a **synthesized** **array** of polymers. For example, according to some embodiments the channel block is used to direct receptor solutions having different receptor. . .

DETDESC:

DETD(128)

According . . . on the substrate. According to these embodiments, an array of microvalves is formed and operated by an overlying or underlying **array** of **electrodes** that is used to energize selected valves to open and close such valves.

2. 5,674,743, Oct. 7, 1997, Methods and apparatus for DNA sequencing; Kevin M. Ulmer, **435/287.2**; 422/82.08; **435/288.7**; **436/94**, **172** [IMAGE AVAILABLE]

US PAT NO: 5,674,743 [IMAGE AVAILABLE] L9: 2 of 11

ABSTRACT:
The present invention provides a method and apparatus for automated DNA sequencing. The method of the invention includes the steps of: a) using a processive exonuclease to cleave from a single DNA strand the next available single nucleotide on the strand; b) transporting the single nucleotide away from the DNA strand; c) incorporating the single nucleotide in a fluorescence-enhancing matrix; d) irradiating the single nucleotide to cause it to fluoresce; e) detecting the fluorescence; f) identifying the single nucleotide by its fluorescence; and g) repeating steps a) to f) indefinitely (e.g., until the DNA strand is fully cleaved or until a desired length of the DNA is sequenced). The apparatus of the invention includes a cleaving station for the extraction of DNA from cells and the separation of single nucleotides from the DNA; a transport system to separate the single nucleotide from the DNA and incorporate the single nucleotide in a fluorescence-enhancing matrix; and a detection station for the irradiation, detection and identification of the single nucleotides. The nucleotides are advantageously detected by irradiating the nucleotides with a laser to stimulate their natural fluorescence, detecting the fluorescence spectrum and matching the detected spectrum with that previously recorded for the four nucleotides in order to identify the specific nucleotide.
US-CL-CURRENT: **435/287.2**; 422/82.08; **435/288.7**; **436/94**, **172**

SUMMARY:

BSUM(39)

The . . . sequence information by such terminal cleavage is therefore limited by the point at which the terminal nucleotides have become sufficiently **random** within the population of DNA **molecules** to mask the signal from those chains which are still synchronous.

DETDESC:

DETD(121)

After . . . Typically an electrostatic field is used to orient the nucleotides. Illustrative apparatus for applying such an electric field comprises an **array** of **electrodes** 89 surrounding the microchannel in the region where hydrodynamic focusing occurs.

3. 5,653,939, Aug. 5, 1997, Optical and electrical methods and apparatus for molecule detection; Mark A. Hollis, et al., 422/50; 204/456; 422/68.1, 76, 82.01, 82.02, 82.05, 91; **435/5**, **6**, **7.1**, **7.9**, **285.2**; **436/149**, **150**, **806**, **807**; **530/300**, **333**, **350** [IMAGE AVAILABLE]

US PAT NO: 5,653,939 [IMAGE AVAILABLE] L9: 3 of 11

ABSTRACT:
A method and apparatus are disclosed for identifying molecular structures within a sample substance using a monolithic array of test sites formed on a substrate upon which the sample substance is applied. Each test site includes probes formed therein to bond with a predetermined target molecular structure or structures. A signal is applied to the test sites and certain electrical, mechanical and/or optical properties of the test sites are detected to determine which probes have bonded to an associated target molecular structure.
US-CL-CURRENT: 422/50; 204/456; 422/68.1, 76, 82.01, 82.02, 82.05, 91; **435/5**, **6**, **7.1**, **7.9**, **285.2**; **436/149**, **150**, **806**, **807**; **530/300**, **333**, **350**

SUMMARY:

BSUM(16)

In an alternate optical embodiment of the invention, a charge-coupled-device (CCD) **array** is provided, with each **electrode** of the CCD **array** aligned with a respective adjacent test site. Light attenuation, caused by greater absorption of illuminating light in test sites with hybridized molecules is used to determine the sites with the hybridized **molecules**. The CCD **array** can be integrated with a corresponding test site array. Alternatively the test site array may be a separate disposable plate.

DETDESC:

DETD(6)

The . . . 12 differ in a known sequence for simultaneo[redacted]ection of a plurality of different targets (or subsequences within a target **molecule**) within a single **array** 10.

DETDESC:

DETD(55)

The . . . biochemical reaction is transmitted by thermal conduction through the thin device layers and detected as a noise burst on the **electrode** 220. The **array** may also be flood-irradiated with infrared, visible, or ultraviolet light in the configuration of FIG. 15. In this case, light. . .

DETDESC:

DETD(65)

In order to begin probe **synthesis**, the **array** is then immersed in de-protecting solution, typically dilute dichloroacetate in alcohol. Laser beam 414, generated by laser 416 is then. . .

DETDESC:

DETD(66)

DNA probe **synthesis** can now be performed on the **array**. Any of the known **chemistries** can be employed, including phosphoramidite, phosphotriester or hydrogen phosphonate methods. The chip is immersed in a solution containing one of. . .

DETDESC:

DETD(68)

The . . . cytosine. In all, because there are four nucleic acid bases, four cycles of irradiation are required to extend the probe **array** by one nucleic acid subunit. To **synthesize** an **array** of ten-base-long probes, forty cycles would be required.

DETDESC:

DETD(69)

Laser. . . since synthesis reactions are known to be highly temperature sensitive, an argon or infrared laser may be used to initiate **synthesis** by local heating of an **array** site.

CLAIMS:

CLMS(11)

11. Apparatus for synthesizing molecular probes in situ comprising:
a) an array of test sites each site containing precursor **molecules** to be reacted;
b) an **array** of resistors disposed adjacent to the test site array with a respective resistor located in proximity to a respective test. . .

CLAIMS:

CLMS(14)

14. The apparatus of claim 13 wherein the **array** and **electrodes** are formed in integrated structures.

CLAIMS:

CLMS(16)

16. Apparatus for enhancing hybridization between a synthesized probe and a target **molecule** comprising:
a) an **array** of test sites each site containing a plurality of probes, each test site having probes of known binding characteristics, and. . .

4. 5,632,957, May 27, 1997, Molecular biological diagnostic systems including electrodes; Michael J. Heller, et al., 422/68.1, 50, 52, 55, 56, 61, 62, 63, 67, 69, 81, 82.01, 82.02, 82.03, 82.04, 82.05; **435/6**, **7.1**, **173.1**; **436/501**; **536/22.1**, **23.1**, **24.1** [IMAGE AVAILABLE]

ABSTRACT:

A system for performing molecular biological diagnosis, analysis and multi-step and multiplex reactions utilizes a self-addressable, self-assembling microelectronic system for actively carrying out controlled reactions in microscopic formats. These reactions include most molecular biological procedures, such as nucleic acid hybridization, antibody/antigen reaction, and clinical diagnostics. Multi-step **combinatorial** biopolymer **synthesis** may be performed. A controller interfaces with a user via input/output devices, preferably including a graphical display. Independent electronic control is achieved for the individual microlocations. In the preferred embodiment, the controller interfaces with a power supply and interface, the interface providing selective connection to the microlocations, polarity reversal, and optionally selective potential or current levels to individual electrodes. A system for performing sample preparation, hybridization and detection and data analysis integrates multiple steps within a combined system. Charged materials are transported preferably via free field electrophoresis. DNA complexity reduction is achieved preferably by binding of DNA to a support, followed by cleaving unbound materials, such as by restriction enzymes, followed by transport of the cleaved DNA fragments. Active, programmable matrix devices are formed in a variety of formats, including a square matrix pattern with fanned out electrical connections, an array having electrical connections and optionally optical connections from beneath the specific microlocations. A highly automated DNA diagnostic system results.

US-CL-CURRENT: 422/68.1, 50, 52, 55, 56, 61, 62, 63, 67, 69, 81, 82.01, 82.02, 82.03, 82.04, 82.05; **435/6**, **7.1**, **173.1**; **436/501**; **536/22.1**, **23.1**, **24.1**

ABSTRACT:

A. . . microscopic formats. These reactions include most molecular biological procedures, such as nucleic acid hybridization, antibody/antigen reaction, and clinical diagnostics. Multi-step **combinatorial** biopolymer **synthesis** may be performed. A controller interfaces with a user via input/output devices, preferably including a graphical display. Independent electronic control. . .

DETDESC:

DETD(33)

The . . . than one Source/Measure supply to be utilized to provide different levels of positive and negative potential or current to different **electrodes**. The **array** of relays is provided by a National Instruments SCXI Chassis with nine 16-channel, Class 3 Relay Modules connected in the. . .

DETDESC:

DETD(54)

Mesh type permeation layers involve **random** arrangements of polymeric **molecules** that form mesh like structures having an average pore size determined by the extent of cross-linking. We have demonstrated the. . .

CLAIMS:

CLMS(24)

24. The system of claim 23 wherein the active, programmable electronic analytical component device comprises an **array** of **electrodes** in a row and column format.

5. 5,622,872, Apr. 22, 1997, Analyte detection through observed optical modulation of polymerized lipid layers; Hans O. Ribi, **436/518**; 204/403; 422/82.08, 82.09; **435/7.1**, **7.5**, **288.7**; **436/532** [IMAGE AVAILABLE]

ABSTRACT:

Bioelectronic sensors are provided employing a thin surfactant polymeric electrically conducting layer to which may be bound members of specific binding pairs. Binding of an analyte or a reagent to the specific binding pair member layer may change the electrical, optical, or structural properties of the layer for measurement of analyte. The change in the polymeric layer provides for a sensitive measurement.

US-CL-CURRENT: **436/518**; 204/403; 422/82.08, 82.09; **435/7.1**,

7.5, **288.7**; **436/532**

SUMMARY:

BSUM(8)

U.S. Pat. No. 4,489,133 and EPA 0,274,824 describe procedures and compositions involving orderly **arrays** of protein **molecules** bound to surfactants. Lochner et al., Phys. Status Solidi (1978) 88:653-661 describes photoconduction in polydiacetylene multilayer structures and single crystals.. . .

SUMMARY:

BSUM(10)

Bioelectronic . . . of analyte in a sample. Bioelectronic devices are designed comprising an electrically insulating substrate, an electrically conductive organic layer, an **electrode** **array** in electrical contact with the electrically conducting organic layer, and insulation for protecting the electrodes from contact with sample medium.

DETDESC:

DETD(105)

High . . . above, selected for their crystalline quality, and oriented in the electrode formation apparatus. First, the dimensions and orientation of the **electrode** **array** are programmed with a computer interface. Second, thin lines of conductive ink are traced in the desired location by extrusion. . .

DETDESC:

DETD(118)

Crystalline . . . not condense into crystalline arrays. The polymer-bound strept/avidin thus provides a template for ordering other biologically, electronically, or structurally important **molecules**. Crystalline **arrays** of strept/avidin on crystalline polymer surfaces are useful for circular dichroism measurements. Lattice orientation of the analyte molecule coupled with. . .

DETDESC:

DETD(133)

If. . . laminated device. This configuration allows for all of the bioelectronic sensors to be monitored simultaneously. Alternatively, one may interrogate each **electrode** **array** separately by having individual leads.

DETDESC:

DETD(141)

With a single device, by placing and protecting the **electrodes** in a square or rectangular **array**, the configuration provides for an efficient sample delivery system. The electrode configuration allows water to be placed over the protected electrode in such a way that the protectant creates a barrier which retains the water. A convenient **electrode** **array** size for performing biological measurement is approximately 0.5 cm.sup.2. The size should allow for retention of the aqueous droplet above the **electrode** **array**. The single device can be converted to a flow cell device with the use of silicon rubber barriers and an. . .

6. 5,605,662, Feb. 25, 1997, Active programmable electronic devices for molecular biological analysis and diagnostics; Michael J. Heller, et al., 422/68.1; 204/600, 601; 257/414; 422/50, 55, 56, 57, 58, 63, 69, 82.01, 82.02, 82.05, 82.06, 82.07, 82.08, 82.09, 129, 131, 138; **435/6**, **7.1**, **90**, **91.1**, **91.2**, **91.3**, **91.5**, **91.51**, **173.1**, **174**, **176**, **177**, **283.1**, **285.1**, **285.2**, **287.1**, **287.2**, **287.3**, **287.7**, **287.8**, **287.9**, **288.7**, **290.1**, **292.1**, **299.1**, **808**, **814**; **436/63**, **164**, **165**, **166**, **169**, **172**, **175**, **501**, **518**, **524**, **525**, **528**, **531**, **532**, **535**, **805**; 438/49 [IMAGE AVAILABLE]

US PAT NO: 5,605,662 [IMAGE AVAILABLE] L9: 6 of 11

ABSTRACT:

A self-addressable, self-assembling microelectronic device is designed and fabricated to actively carry out and control multi-step and multiplex molecular biological reactions in microscopic formats. These reactions include nucleic acid hybridization, antibody/antigen reaction, diagnostics, and biopolymer synthesis. The device can be fabricated using both microlithographic and micromachining techniques. The device can electronically control the transport and attachment of specific binding entities to specific micro-locations. The specific binding entities include molecular biological molecules such as nucleic acids and polypeptides. The device can subsequently control the transport and reaction of analytes or reactants at the addressed specific microlocations. The device is able to concentrate analytes and reactants, remove non-specifically bound molecules, provide stringency control for DNA hybridization reactions, and improve the detection of analytes. The device can be electronically replicated.

US-CL-CURRENT: 422/68.1; 204/600, 601; 257/414; 422/50, 55, 56, 57, 58, 63, 69, 82.01, 82.02, 82.05, 82.06, 82.07, 82.08, 82.09, 129, 131, 138; **435/6**, **7.1**, **90**, **91.1**, **91.2**, **91.3**, **91.5**, **91.51**, **173.1**, **174**, **176**, **177**, **283.1**, **285.1**, **285.2**, **287.1**, **287.2**, **287.3**, **287.7**, **287.8**, **287.9**, **288.7**, **290.1**, **292.1**, **299.1**, **808**, **814**; **436/63**, **164**, **165**, **166**, **169**, **172**, **175**, **501**, **518**, **524**, **525**, **528**, **531**, **532**, **535**, **805**; 438/49

SUMMARY:

BSUM(23)

Fodor . . . on a matrix. Pirrung et al., in U.S. Pat. No. 5,143,854, Sep. 1, 1992, teach large scale photolithographic solid phase **synthesis** of polypeptides in an **array** fashion on silicon substrates.

DRAWING DESC:

DRWD(15)

FIGS. 14a, 14b, 14c, 14d, 14e, and 14f show a scheme of electronically directed **combinatorial** **synthesis** of oligonucleotides, FIG. 14a showing addressable microlocations with blocking groups, FIG. 14b showing addressable microlocations with blocking groups in combination. . .

DETDESC:

DETD(2)

The . . . addressing of each specific micro-location with specific binding entities. The self-addressed device is subsequently able to actively carry out multi-step, **combinatorial**, and **multiplex** reactions at any of its micro-locations. The device is able to electronically direct and control the rapid movement and concentration. . .

DETDESC:

DETD(3)

The . . . to each micro-location. The third section, "Applications of the Devices," describes how the device provides electronic control of various multi-step, **combinatorial**, and **multiplex** reactions. This section also describes the various uses and applications of the device.

DETDESC:

DETD(24)

The . . . pattern on the chip. This includes an outside perimeter of metal contact pads, the connective circuitry (wires), and the center **array** of micro-**electrodes** which serve as the underlying base for the addressable micro-locations.

DETDESC:

DETD(53)

biopolymer **synthesis** procedures, e.g., **combinatorial** **synthesis** of oligonucleotides or peptides;

DETDESC:

DETD(65)

Yet another method for addressing the device is to carry out the **combinatorial** **synthesis** of the specific oligonucleotides at the specific micro-locations. **Combinatorial** **synthesis** is described in a later section.

DETDESC:

DETD(90)

COMBINATORIAL BIOPOLYMER **SYNTHESIS**

DETDESC:

DETD(91)

The devices of this invention are also capable of carrying out **combinatorial** **synthesis** of biopolymers such as oligonucleotides and peptides. Such a process allows self-directed synthesis to occur without the need for any outside direction or influence. This **combinatorial** **synthesis** allows very large numbers of sequences to be synthesized on a device. The basic concept for **combinatorial** **synthesis** involves the use of the device to transport, concentrate, and react monomers, coupling reagents, or deblocking reagents at the addressable. . .

DETDESC:

DETD(92)

One method for **combinatorial** oligonucleotide **synthesis** is shown in FIGS. 14a through 14f. This method begins with a set of selectively addressable micro-locations (140) whose surfaces. . .

7. 5,491,097, Feb. 13, 1996, Analyte detection with multilayered bioelectronic conductivity sensors; Hans O. Ribi, et al., **436/518**; 422/82.01, 82.02, 82.03, 82.06; **435/7.1**, **7.5**, **7.92**; **436/501**, **527**, **531**, **806** [IMAGE AVAILABLE]

US PAT NO: 5,491,097 [IMAGE AVAILABLE] L9: 7 of 11

ABSTRACT:
Methods are provided for the detection of an analyte in a sample using a bioelectronic sensor comprising a thin surfactant polymeric electrically conducting layer to which members of specific binding pairs are bound. Specific binding of analyte or analyte competitor to the bound specific binding pair member results in a change in the conductivity of the polymer. The resultant change in conductivity is related to the presence of analyte in the sample.
US-CL-CURRENT: **436/518**; 422/82.01, 82.02, 82.03, 82.06; **435/7.1**, **7.5**, **7.92**; **436/501**, **527**, **531**, **806**

SUMMARY:

BSUM(8)

U.S. Pat. No. 4,489,133 and EPA 0,274,824 describe procedures and compositions involving orderly **arrays** of protein **molecules** bound to surfactants. Lochner et al., Phys. Status Solidi (1978) 88:653-661 describes photoconduction in polydiacetylene multilayer structures and single crystals.. . .

SUMMARY:

BSUM(10)

Bioelectronic . . . of analyte in a sample. Bioelectronic devices are designed comprising an electrically insulating substrate, an electrically conductive organic layer, an **electrode** **array** in electrical contact with the electrically conducting organic layer, and insulation for protecting the electrodes from contact with sample medium.

DETDESC:

DETD(105)

High . . . above, selected for their crystalline quality, and oriented in the electrode formation apparatus. First, the dimensions and orientation of the **electrode** **array** are programmed with a computer interface. Second, thin lines of conductive ink are traced in the desired location by extrusion. . .

DETDESC:

DETD(118)

Crystalline . . . not condense into crystalline arrays. The polymer-bound strept/avidin thus provides a template for ordering other biologically, electronically, or structurally important **molecules**. Crystalline **arrays** of strept/avidin on crystalline polymer surfaces are useful for circular dichroism measurements. Lattice orientation of the analyte molecule coupled with. . .

DETDESC:

DETD(133)

If. . . laminated device. This configuration allows for all of the bioelectronic sensors to be monitored simultaneously. Alternatively, one may interrogate each **electrode** **array** separately by having individual leads.

DETDESC:

DETD(141)

With a single device, by placing and protecting the **electrodes** in a square or rectangular **array**, the configuration provides for an efficient sample delivery system. The electrode configuration allows water to be placed over the protected electrode in such a way that the protectant creates a barrier which retains the water. A convenient **electrode** **array** size for performing biological measurement is approximately 0.5 cm.sup.2. The size should allow for retention of the aqueous droplet above the **electrode** **array**. The single device can be converted to a flow cell device with the use of silicon rubber barriers and an. . .

CLAIMS:

CLMS(1)

What . . .

A method for detecting an analyte in a sample with a bioelectronic sensor, said sensor comprising:
an electrically inert substrate;
an **electrode** **array** comprising a plurality of interdigitating parallel electrodes supported by said substrate, defining two sets of parallel electrodes, each of said. . .

CLAIMS:

CLMS(4)

4. A method for detecting an analyte in a sample with a bioelectronic sensor, said sensor comprising:
an electrically inert substrate;
an **electrode** **array** comprising a plurality of interdigitating parallel electrodes supported by said substrate, defining two sets of parallel electrodes, each of said. . .

CLAIMS:

CLMS(5)

5. A method for detecting an analyte in a sample with a bioelectronic sensor, said sensor comprising:
an electrically inert substrate;
an **electrode** **array** comprising a plurality of interdigitating parallel electrodes supported by said substrate, defining two sets of parallel electrodes, each of said. . .

8. 5,384,261, Jan. 24, 1995, Very large scale immobilized polymer synthesis using mechanically directed flow paths; James L. Winkler, et al., **436/518**; 422/134, 149; **435/7.1**, **968**, **969**, **970**, **973**; **436/501**, **527**, **531**, **532**, **807**, **809**; **530/334**, **335**, **337** [IMAGE AVAILABLE]

US PAT NO: 5,384,261 [IMAGE AVAILABLE] L9: 8 of 11

ABSTRACT:
A method and device for forming large arrays of polymers on a substrate

(401). According to a preferred aspect of the invention, the substrate is contacted by a channel block (407) having channels (40[illegible]) therein. Selected reagents are flowed through the channels, the substrate is rotated by a rotating stage (403), and the process is repeated to form arrays of polymers on the substrate. The method may be combined with light-directed methodolgies.
US-CL-CURRENT: **436/518**; 422/134, 149; **435/7.1**, **968**, **969**, **970**, **973**; **436/501**, **527**, **531**, **532**, **807**, **809**; **530/334**, **335**, **337**

DRAWING DESC:

DRWD(5)

FIG. . . . is a top view and FIG. 4b is a cross-sectional view of a first embodiment of a device used to **synthesize** **arrays** of polymer sequences;

DETDESC:

DETD(31)

The present invention provides for the **synthesis** of **arrays** of large numbers of different polymer sequences. According to a preferred embodiment of the invention, the invention provides for the **synthesis** of an **array** of different peptides in selected regions of a substrate. Such substrates having the diverse sequences formed thereon may be used. . .

DETDESC:

DETD(42)

FIG. . . . and BC have been formed using only two process steps. Accordingly, it is seen that the process provides for the **synthesis** of vast **arrays** of polymer sequences using only a relatively few process steps. By way of further example, it is necessary to use. . .

DETDESC:

DETD(57)

Through . . . created by "dead spots" in the flow channels when reagents are pumped through the channels. According to these embodiments, the **array** of **synthesized** polymers can easily cover the entire substrate. Such embodiments may simultaneously couple up to, e.g., 20 peptides in a single. . .

DETDESC:

DETD(59)

According . . . the receptor binds. According to some embodiments, the channel block is used to direct solutions containing a receptor over a **synthesized** **array** of polymers. For example, according to some embodiments the channel block is used to direct receptor solutions having different receptor. . .

DETDESC:

DETD(62)

According . . . on the substrate. According to these embodiments, an array of microvalves are formed and operated by an overlying or underlying **array** of **electrodes** which are used to energize selected valves to open and close such valves.

9. 5,234,566, Aug. 10, 1993, Sensitivity and selectivity of ion channel biosensor membranes; Peter D. J. Osman, et al., 204/403, 416, 418, 426; **435/817**; **436/806** [IMAGE AVAILABLE]

US PAT NO: 5,234,566 [IMAGE AVAILABLE] L9: 9 of 11

ABSTRACT:

The present invention provides a biosensor comprising at least one lipid membrane, each membrane including at least one gated ion channel. The membranes comprise a closely packed **array** of self-assembly amphophilic **molecules** and the gated ion channel has a conductance which is dependent upon an electric field applied across the membrane. The biosensor of the present invention may comprise a plurality of discrete membranes each including at least one gated ion channel. The conductance of each of the membranes is measurable independently of the conductance of the other membranes.
US-CL-CURRENT: 204/403, 416, 418, 426; **435/817**; **436/806**

ABSTRACT:

The . . . at least one lipid membrane, each membrane including at least one gated ion channel. The membranes comprise a closely packed **array** of self-assembly amphophilic **molecules** and the gated ion channel has a conductance which is dependent upon an electric field applied across the membrane. The. . .

SUMMARY:

BSUM(9)

The . . . one lipid membrane each membrane including at least one gated ion channel, each of said membranes comprising a closely packed **array** of self-assembling amphiphilic **molecules**, said at least one gated ion channel having a conductance which is dependent upon an electric field applied across the. . .

SUMMARY:

BSUM(11)

In . . . of discrete membranes, each membrane including at least one gated ion channel, each of said membranes comprising a closely packed **array** of self-assembling amphiphilic **molecules**, the conductance of each of said membranes being measurable independently of the conductance of the other membranes.

DETDESC:

DETD(23)
c. . . . applied to a non-linear transfer point such as the non-linear conductance of the FEIC. Thus, by switching between the modulating **electrodes** separate elements on the **array** can be addressed. (FIG. 2). A single high impedance measuring electrode only is required.

DETDESC:

DETD(69)
(b) . . . is coupled to excitation sources via a resistor network so that two signal lines can be used to address the **electrode** in a two dimensional **array**.

DETDESC:

DETD(79)

FIG. . . . required where the preamplifier used is as shown in FIG. 6. The system for switching (multiplexing) the signal to an **array** of **electrodes** and sensing the resultant signal with a single current sensing amplifier is shown generally as 37 and described in more. . .

DETDESC:

DETD(83)

The . . . bridge in which an amplifier 56 supplies an excitation signal to an electrode 57, which is coated with a membrane. **Electrode** 57 is one of an **array** of **electrodes** and the excitation signal can be switched to each **electrode** in the **array**. An **electrode** 58 detects the current passing through electrode 57 and amplifies it with a high impedance amplifier 59. Thus the conductance of an **array** of **electrodes** such as 57 can be measured.

CLAIMS:

CLMS(1)

We. . .

each membrane being measurable independently of the conductance of the other membranes, each of said membranes comprising a closely packed **array** of self-assembling amphophilic **molecules**, at least one dedicated electrode provided on one side of the membrane which cooperates with an electrode on the other. . .

CLAIMS:

CLMS(4)

4. . . . substantially identical membranes, each membrane including at least one gated ion channel, each of said membranes comprising a closely packed **array** of self-assembling amphophilic **molecules**, the conductance of each of said membranes being measurable independently of the conductance of the other membranes, at least one. . .

10. 5,066,372, Nov. 19, 1991, Unitary multiple electrode sensor; Howard H. Weetall, 205/777.5; 204/403, 412; 205/337; **435/7.7**, **7.92**, **14**, **25**, **817**; **436/518**, **532**, **535**, **806** [IMAGE AVAILABLE]

US PAT NO: 5,066,372 [IMAGE AVAILABLE] L9: 10 of 11

ABSTRACT:
A unitary multiple electrode sensor for detecting analytes in test samples and devices for using them. The unitary multiple electrode sensor includes a sensor support member and at least one **electrode** **array** being deposited on the sensor support member, the **electrode** **array** having sensor-activating **chemical**(s) attached to an embodient thereof. A test sample is applied to the **electrode** **array** to begin the test; and a sensor apparatus measures the test reaction which is occurring on the **electrode** **array**.
US-CL-CURRENT: 205/777.5; 204/403, 412; 205/337; **435/7.7**, **7.92**, **14**, **25**, **817**; **436/518**, **532**, **535**, **806**

ABSTRACT:
A . . . samples and devices for using them. The unitary multiple electrode sensor includes a sensor support member and at least one **electrode** **array** being deposited on the sensor support member, the **electrode** **array** having sensor-activating **chemical**(s) attached to an embodient thereof. A test sample is applied to the **electrode** **array** to begin the test; and a sensor apparatus measures the test reaction which is occurring on the **electrode** **array**.

SUMMARY:

BSUM(7)

The . . . apparatus therefor. In particular, it comprises a sensor support member having an electrically non-conductive surface and at least one spaced **electrode** **array** deposited on the surface comprising a working electrode, a counter electrode, and a reference electrode. Unlike the electrodes of the. . .

SUMMARY:

BSUM(8)

The sensor apparatus is designed to measure redox reactions occurring on the surface of the **electrode** **array**. Thus, it comprises an ammeter having a sensor receiving area designed and configured to receive and hold the support member. . .

DRAWING DESC:

DRWD(3)

FIG. 2 is a cross-sectional view of an **electrode** **array**.

DETDESC:

DETD(4)

The **electrode** **array** (20) may be deposited within the well or, if wells are not used, simply laid onto the support member surface. FIGS. 2 and 3 illustrate the structure of an **electrode** **array**. Three graphite **electrodes** are silk-screened onto the support member. In the center is a circular working electrode (22) surrounded on either side by. . .

DETDESC:

DETD(10)

The . . . be used to perform immunoassays. The following example demonstrates an assay for the free thyroid hormone thyroxine (T.sub.4). A graphite **electrode** **array** having a working **electrode** surface area of 200 mm.sup.2 is coated with a 20 ul aliquot of 1:75 collodion in a 0.5M ferrocene in. . . of [illegible] n serum containing T.sub.4 and 10 ul of a T.sub.4 glucose oxidas[illegible]jugate (T.sub.4 -G.O.) are pipetted onto the **electrode** **array**. After ten minutes of incubation, 10 ul of a 25% w/v glucose solution is added. The sensor is now ready. . .

DETDESC:

DETD(14)

The same procedure as in Example 1 is followed except a different conjugate and sample are used. More particularly, above the **electrode** **array** is deposited 50 ug of a magnetic solid phase conjugate comprising MAGIC.RTM. magnetic particles from Ciba Corning Diagnostics Corp, coupled. . . sample of human serum containing IgE and 10 ul of an IgE glucose oxidase conjugate (IgE-G.O.) are pippetted onto the **electrode** **array**. After ten (10) minutes of incubation, 10 ul of a 25% w/v glucose solution is added.

CLAIMS:

CLMS(1)

What. . .
electrically non-conductive surface; and
(ii) at least one well deposited on the support member, wherein within each well is deposited an **electrode** **array**, the **array** defining an area on the support member for applying a test sample, the **array** consisting of a working **electrode**, a counter electrode and a reference electrode; and wherein the **electrodes** of the **array** are spaced from one another horizontally and vertically in said well, and wherein sensor activating chemicals are located on or attached to the working **electrode** of the **array**, the sensor activating **chemicals** comprising an electron transfer mediator, a first conjugate including a specific binding partner for the analyte to be measured, and. . .
the array on which said test sample was applied;
(c) applying a preselected potential between the working electrode and the counter **electrode** of the **array**;
(d) measuring the current between the working electrode and the counter **electrode** of the **array**; and
(e) determining the amount of the analyte in the test sample from the measurement of the current in step d). . .

CLAIMS:

CLMS(3)

3. . . . drawn to a magnet during the performance of said method; and wherein said magnet is located adjacent to the working **electrode** or the **array**.

11. 4,963,245, Oct. 16, 1990, Unitary multiple electrode sensor; Howard H. Weetall, 204/403, 412; **435/7.1**, **14**, **25**, **817**; **436/518**, **532**, **535**, **806** [IMAGE AVAILABLE]

US PAT NO: 4,963,245 [IMAGE AVAILABLE] L9: 11 of 11

ABSTRACT:
A unitary multiple electrode sensor for detecting analytes in blood or blood component samples and devices for using them. The unitary multiple electrode sensor includes a sensor support member and at least one **electrode** **array** being deposited on the sensor support member, the **electrode** **array** having sensor-activating **chemical**(s) attached to an embodiment thereof. A test sample is applied to the **electrode** **array** to begin the test; and a sensor apparatus measures the test reaction which is occurring on the **electrode** **array**.
US-CL-CURRENT: 204/403, 412; **435/7.1**, **14**, **25**, **817**; **436/518**, **532**, **535**, **806**

ABSTRACT:
A . . . samples and devices for using them. The unitary multiple electrode sensor includes a sensor support member and at least one **electrode** **array** being deposited on the sensor support member, the **electrode** **array** having sensor-activating **chemical**(s) attached to an embodiment thereof. A test sample is applied to the **electrode** **array** to begin the test; and a sensor apparatus measures the test reaction which is occurring on the **electrode** **array**.

SUMMARY:

BSUM(7)

The. . . apparatus therefor. In particular, it comprise[illegible]sor support member having an electrically non-conductive [illegible]e and at least one spaced **electrode** **array** deposited on the surface comprising a working electrode, a counter electrode, and a reference electrode. Unlike the electrodes of the. . .

SUMMARY:

BSUM(8)

The sensor apparatus is designed to measure redox reactions occurring on the surface of the **electrode** **array**. Thus, it comprises an ammeter having a sensor receiving area designed and configured to receive and hold the support member. . .

DRAWING DESC:

DRWD(3)

FIG. 2 is a cross-sectional view of an **electrode** **array**.

DETDESC:

DETD(4)

The **electrode** **array** (20) may be deposited within the well or, if wells are not used, simply laid onto the support member surface. FIGS. 2 and 3 illustrate the structure of an **electrode** **array**. Three graphite **electrodes** are silk-screened onto the support member. In the center is a circular working electrode (22) surrounded on either side by. . .

DETDESC:

DETD(10)

The . . . be used to perform immunoassays. The following example demonstrates an assay for the free thyroid hormone thyroxine (T.sub.4). A graphite **electrode** **array** having a working **electrode** surface area of 200 mm.sup.2 is coated with a 20 .mu.l aliquot of 1:75 collodion in a 0.5M ferrocene in. . . of human serum containing T.sub.4 and 10 .mu.l of a T.sub.4 glucose oxidase conjugate (T.sub.4 -G.O.) are pipetted onto the **electrode** **array**. After ten minutes of incubation, 10 .mu.l of a 25% w/v glucose solution is added. The sensor is now ready. . .

DETDESC: d his

DETD(14)

The same procedure as in Example 1 is followed except a different conjugate and sample are used. More particularly, above the **electrode** **array** is deposited 50 .mu.g of a magnetic solid phase conjugate comprising MAGIC.sup.R magnetic particles from Ciba Corning Diagnostics Corp, coupled. . . sample of human serum containing IgE and 10 .mu.l of an IgE glucose oxidase conjugate (IgE-G.O.) are pippetted onto the **electrode** **array**. After ten (10) minutes of incubation, 10 .mu.l of a 25% w/v glucose solution is added.

CLAIMS:

CLMS(1)

1. . .
electrically non-conductive surface; and
(ii) a plurality of wells deposited on the support member, wherein within each well is deposited an **electrode** **array**, the **array** defining an area on the support member for applying a test sample, the **array** consisting of a working **electrode**, a counter electrode and a reference electrode; and wherein the **electrodes** of the **array** are spaced from one another horizontally and vertically in said well, and wherein sensor activating chemicals are located on or attached to the working **electrode** of the **array**, the sensor activating **chemicals** comprising an electron transfer mediator, a first conjugate including a specific binding partner for the analyte to be measured, and. . . to an oxidizing catalyst or oxidizing substrate; and wherein the second conjugate is located on or attached to the working **electrode** of said **array** following the application of the test sample;
(b) applying an electron source onto the array on which said test sample was applied;
(c) applying a preselected [illegible]ial between the working electrode and the counter **electrode** [illegible] **array**;
(d) measuring the current between the working electrode and the counter **electrode** of the **array**; and
(e) determining the amount of the analyte in the test sample from the measurement of the current in step (d). . .

CLAIMS:

CLMS(3)

3. . . . drawn to a magnet during the performance of said immunoassay; and wherein said magnet is located adjacent to the working **electrode** of the **array**.

=>

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L4 43748 S 435/CLAS
L5 18837 S 436/CLAS
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1. 5,849,164, Dec. 15, 1998, Cell with blade electrodes and recirculation chamber; Gerald R. Pohto, **204/288, 237, 254, 255, 256, 268, 270, 280, 286, 289, 290F, 290R** [IMAGE AVAILABLE]

2. 5,843,301, Dec. 1, 1998, Electrodynamic-chemical processing for beneficiation of petroleum residue; Ernest P. Esztergar, et al., 208/309; **204/513, 514, 554; 205/695, 696** [IMAGE AVAILABLE]

3. 5,830,343, Nov. 3, 1998, Electrochemical analysis process; Rainer Hintsche, et al., **205/775; 204/413, 434; 205/789.5** [IMAGE AVAILABLE]

4. 5,814,200, Sep. 29, 1998, Apparatus for separating by dielectrophoresis; Ronald Pethig, et al., **204/547, 643** [IMAGE AVAILABLE]

5. 5,804,065, Sep. 8, 1998, Control apparatus for marine animals; Arvin L. Kolz, 210/170; 134/1, 166R; **204/286; 205/705**; 210/747, 748 [IMAGE AVAILABLE]

6. 5,804,056, Sep. 8, 1998, Process and apparatus for producing strip products from stainless steel; Franz Gerhard Pempera, et al., **205/661; 204/209, 211; 205/709, 710** [IMAGE AVAILABLE]

7. 5,779,891, Jul. 14, 1998, Non-fouling flow through capacitor system; Marc D. Andelman, 210/198.2; **204/600, 645, 647, 671**; 210/243, 541 [IMAGE AVAILABLE]

8. 5,738,778, Apr. 14, 1998, Method related to the sterilization of microorganisms and/or to the mineralization of organic substances including microbic metabolites in a ground region and in the ground water by means of electric current; Falk Doring, **205/701, 744, 758, 761, 766** [IMAGE AVAILABLE]

9. 5,676,820, Oct. 14, 1997, Remote electrochemical sensor; Joseph Wang, et al., **205/777.5; 204/403, 406, 412, 413, 434; 205/776.5, 787, 792, 793.5**; 435/817 [IMAGE AVAILABLE]

10. 5,667,667, Sep. 16, 1997, Electrochemical treatment of surfaces; Edwin Southern, **205/687; 204/267, 412; 205/688, 698, 699, 766** [IMAGE AVAILABLE]

11. 5,653,939, Aug. 5, 1997, Optical and electrical methods and apparatus for molecule detection; Mark A. Hollis, et al., 422/50; **204/456**; 422/68.1, 76, 82.01, 82.02, 82.05, 91; 435/5, 6, 7.1, 7.9, 285.2; 436/149, 150, 806, 807; 530/300, 333, 350 [IMAGE AVAILABLE]

12. 5,624,546, Apr. 29, 1997, Method and apparatus for the detection of toxic gases; Gary A. Milco, **205/779.5; 204/412, 415, 431, 432; 205/780.5, 782.5, 785.5, 786, 793, 794.5**; 422/83, 88, 98 [IMAGE AVAILABLE]

13. 5,620,597, Apr. 15, 1997, Non-fouling flow-through capacitor; Marc D. Andelman, 210/198.2; **204/600, 645, 647, 671**; 210/243, 541 [IMAGE AVAILABLE]

14. 5,609,738, Mar. 11, 1997, Electrode cap with integral tank cover for acid mist collection; James A. Murray, et al., **204/279, 270, 289** [IMAGE AVAILABLE]

15. 5,605,612, Feb. 25, 1997, Gas sensor and manufacturing method of the same; Hyeon S. Park, et al., **204/429**; 73/31.05, 31.06; 338/25, 34, 308, 314; 422/83, 94, 97, 98; 436/153; 438/49 [IMAGE AVAILABLE]

16. 5,603,351, Feb. 18, 1997, Method and system for inhibiting cross-contamination in fluids of combinatorial chemistry device; Satyam C. Cherukuri, et al., 137/597; **204/269, 600, 601** [IMAGE AVAILABLE]

17. 5,591,321, Jan. 7, 1997, Detection of fluids with metal-insulator-semiconductor sensors; Stephen C. Pyke, **205/787;**

73/31.06; 204/401, 412, 416; 205/775; 324/71.1, 71.5; 338/34; 422/68.1, 82.01, 82.02, 82.03; 436/144, 149, 150 [IMAGE AVAILABLE]

18. 5,578,183, Nov. 26, 1996, Production of zinc pellets; John F. Cooper, 205/64, 74, 78, 109, 111 [IMAGE AVAILABLE]

19. 5,558,756, Sep. 24, 1996, Method for geo-electrochemical sampling; Richard Van Blaricom, 205/789.5; 204/400, 435; 205/632, 775, 789, 792.5, 793 [IMAGE AVAILABLE]

20. 5,556,530, Sep. 17, 1996, Flat panel display having improved electrode array; Walter Finkelstein, et al., 205/122, 123, 157, 205, 210, 219, 640, 666, 915; 216/79, 99 [IMAGE AVAILABLE]

21. 5,547,555, Aug. 20, 1996, Electrochemical sensor cartridge; Jerome L. Schwartz, et al., 204/418, 403, 412, 415; 422/68.1, 82.01, 82.03; 435/4, 7.1, 287.1, 817 [IMAGE AVAILABLE]

22. 5,532,128, Jul. 2, 1996, Multi-site detection apparatus; Mitchell D. Eggers, et al., 435/6; 204/400, 403; 422/82.01, 82.02; 435/7.1, 7.2, 287.1, 287.2; 436/518, 524, 525, 527, 806, 809 [IMAGE AVAILABLE]

23. 5,470,445, Nov. 28, 1995, Electrode cap with integral tank cover for acid mist collection; James A. Murray, et al., 205/560; 204/278, 279, 288, 289 [IMAGE AVAILABLE]

24. 5,458,752, Oct. 17, 1995, Apparatus and method for the desulfurization of petroleum by bacteria; Hector M. Lizama, et al., 204/164, 558, 567; 422/186; 435/168, 170, 289.1 [IMAGE AVAILABLE]

25. 5,439,578, Aug. 8, 1995, Multiple capillary biochemical analyzer; Norman J. Dovichi, et al., 204/603, 604; 356/318, 344, 417 [IMAGE AVAILABLE]

26. 5,439,577, Aug. 8, 1995, Electrochemical device for generating hydroxyl free radicals and oxidizing chemical substances dissolved in water; Oleh Weres, et al., 204/268, 270, 278, 284, 290F [IMAGE AVAILABLE]

27. 5,437,772, Aug. 1, 1995, Portable lead detector; Emory S. De Castro, et al., 205/775; 204/400, 406, 412, 416, 434; 205/778.5, 780, 780.5, 782, 786, 786.5, 787, 789.5 [IMAGE AVAILABLE]

28. 5,425,867, Jun. 20, 1995, Method and apparatus for producing electrochemical impedance spectra; John L. Dawson, et al., 204/400, 404, 406, 412, 434; 324/71.1, 71.2, 347, 348 [IMAGE AVAILABLE]

29. 5,403,614, Apr. 4, 1995, Method for making an electroluminescent element; Tomoyuki Kawashima, et al., 427/66; 204/192.1, 192.11, 192.22, 192.26; 427/69, 255.5, 282, 419.1, 419.7 [IMAGE AVAILABLE]

30. 5,399,256, Mar. 21, 1995, Electrochemical detector cell; Curtis E. Bohs, et al., 204/409; 73/61.57, 61.58, 61.61; 204/412, 416; 422/82.01, 82.03 [IMAGE AVAILABLE]

31. 5,358,614, Oct. 25, 1994, Method and apparatus for the removal of bioconversion of constituents of organic liquids; Timothy Scott, et al., 204/563, 573, 666, 673; 435/173.2, 173.9, 285.2; 588/261, 900 [IMAGE AVAILABLE]

32. 5,325,853, Jul. 5, 1994, Calibration medium containment system; Russell L. Morris, et al., 600/308; 204/403; 600/345, 573 [IMAGE AVAILABLE]

33. 5,324,409, Jun. 28, 1994, Electrode arrangement for electrolytic cells; Max Mayr, et al., 204/267, 284, 286, 288 [IMAGE AVAILABLE]

34. 5,324,399, Jun. 28, 1994, Method and system for monitoring quality of phosphate coating; Frank A. Ludwig, et al., 205/791; 204/412, 434, DIG.8; 205/794; 427/435, 443.1 [IMAGE AVAILABLE]

35. 5,294,309, Mar. 15, 1994, Electro-abrasive polishing of the inner surface of pipes to extra-smooth mirror finish; Kouichi Seimiya, et al., 205/660, 663 [IMAGE AVAILABLE]

36. 5,271,814, Dec. 21, 1993, Thin film electrocoagulation for removal for contaminants from liquid media; David M. A. Metzler, 205/743; 204/228.4, 228.6, 229.6, 275, 553; 205/761 [IMAGE AVAILABLE]

37. 5,254,235, Oct. 19, 1993, Microelectrode arrays; Huan P. Wu, 204/284, 286, 400, 434 [IMAGE AVAILABLE]

38. 5,252,178, Oct. 12, 1993, Multi-zone plasma processing method and apparatus; Mehrdad M. Moslehi, 134/1.1; 118/50.1, 723E; 134/1; 156/345; 204/298.33, 298.34, 298.37; 216/67 [IMAGE AVAILABLE]

39. 5,139,627, Aug. 18, 1992, Corrosion monitoring; David A. Eden, et al., 205/775.5; 204/404 [IMAGE AVAILABLE]

40. 5,135,630, Aug. 4, 1992, Method of metallizing silicon-containing gel for a solid state light modulator incorporating the metallized gel; Efim S. Goldburt, et al., 204/192.14, 192.15, 192.26, 192.27 [IMAGE AVAILABLE]

41. 5,126,022, Jun. 30, 1992, Method and device for moving molecules by the application of a plurality of electrical fields; David S. Soane, et al., 204/458, 547, 609, 643 [IMAGE AVAILABLE]

42. 5,066,372, Nov. 19, 1991, Unitary multiple electrode sensor; Howard H. Weetall, 205/777.5; 204/403, 412; 205/337; 435/7.7, 7.92, 14, 25, 817; 436/518, 532, 535, 806 [IMAGE AVAILABLE]

43. 5,059,296, Oct. 22, 1991, Portable self-contained solar powered water purifier; Mark Sherman, 204/229.8, 267, 271, 272, 273, 277, 278, 279, 293, 660, 668, DIG.5; 210/85, 192 [IMAGE AVAILABLE]

44. 5,039,386, Aug. 13, 1991, Electrophoretic method for preparative separation of charged molecules in liquids; Joel Margolis, 204/466, 518, 616, 639 [IMAGE AVAILABLE]

45. 4,963,245, Oct. 16, 1990, Unitary multiple electrode sensor; Howard H. Weetall, 204/403, 412; 435/7.1, 14, 25, 817; 436/518, 532, 535, 806 [IMAGE AVAILABLE]

46. 4,940,526, Jul. 10, 1990, Electrophoretic painting apparatus; Stephen P. O'Neill, 204/625 [IMAGE AVAILABLE]

47. 4,874,507, Oct. 17, 1989, Separating constituents of a mixture of particles; David R. Whitlock, 209/11; 204/157.3, 158.2, 553, 649; 209/127.1, 212, 214 [IMAGE AVAILABLE]

48. 4,873,942, Oct. 17, 1989, Plasma enhanced chemical vapor deposition wafer holding fixture; George M. Engle, 118/728, 50.1, 620; 156/345; 204/298.15 [IMAGE AVAILABLE]

49. 4,840,709, Jun. 20, 1989, Single-stage electrochemical image-forming process for reproduction layers; Engelbert Pliefke, 205/108, 214, 219, 317 [IMAGE AVAILABLE]

50. 4,822,465, Apr. 18, 1989, Hydrogen sulphide sensor; Eric Jones, et al., 204/192.1; 73/31.03, 31.05; 204/410, 431 [IMAGE AVAILABLE]

51. 4,786,352, Nov. 22, 1988, Apparatus for in-situ chamber cleaning; David W. Benzing, 156/345; 134/1, 1.1; 204/298.34 [IMAGE AVAILABLE]

52. 4,654,118, Mar. 31, 1987, Selectively etching microstructures in a glow discharge plasma; Edward J. Staples, 216/13; 29/25.35; 156/345; 204/192.32, 298.34; 216/63, 67, 79 [IMAGE AVAILABLE]

53. 4,646,196, Feb. 24, 1987, Corona generating device; Louis Reale, 361/230; 204/164; 250/324; 361/225 [IMAGE AVAILABLE]

54. 4,632,737, Dec. 30, 1986, Electrolytic reduction of nitrate from solutions of alkali metal hydroxides contaminated by oxidizing transition metal ions; Albert B. Mindler, 205/342, 510 [IMAGE AVAILABLE]

55. 4,614,573, Sep. 30, 1986, Method for producing an ozone gas and apparatus for producing the same; Senichi Masuda, **204/176**; 422/186.04, 186.18, 186.19 [IMAGE AVAILABLE]

56. 4,605,473, Aug. 12, 1986, Hypochlorite activated gold electrode and measuring system and method; Lamar R. Dewald, **205/780; 204/290R, 400, 409, 411, 412; 205/316** [IMAGE AVAILABLE]

57. 4,596,649, Jun. 24, 1986, Measuring system comprising ion-selective electrodes; Gerhard Hofmeier, et al., **204/411, 409** [IMAGE AVAILABLE]

58. 4,564,422, Jan. 14, 1986, Method and apparatus for detection of erosive cavitation in an aqueous solution; Raynald Simoneau, et al., **205/775; 204/400**; 324/71.2, 425 [IMAGE AVAILABLE]

59. 4,531,088, Jul. 23, 1985, Blood analysis; John D. Czaban, et al., 324/71.1; **204/411**; 324/438, 450 [IMAGE AVAILABLE]

60. 4,468,306, Aug. 28, 1984, Biodic electrofiltration; Mark P. Freeman, et al., **204/517, 535, 637** [IMAGE AVAILABLE]

61. 4,425,215, Jan. 10, 1984, Gas generator; Richard W. Henes, **204/258, 270, 278** [IMAGE AVAILABLE]

62. 4,422,917, Dec. 27, 1983, Electrode material, electrode and electrochemical cell; Peter C. S. Hayfield, **204/196.01, 196.38, 242, 268, 269, 290F, 291**; 392/338; 423/609 [IMAGE AVAILABLE]

63. 4,418,645, Dec. 6, 1983, Glow discharge apparatus with squirrel cage electrode; John C. Knights, 118/715, 50.1, 723E; 136/258; **204/164** [IMAGE AVAILABLE]

64. 4,357,222, Nov. 2, 1982, Electrolphoretic casting process; John W. Lucek, **204/472, 483** [IMAGE AVAILABLE]

65. 4,340,457, Jul. 20, 1982, Ion selective electrodes; John A. R. Kater, **204/415, 403**; 600/348 [IMAGE AVAILABLE]

66. 4,288,309, Sep. 8, 1981, Electrolytic device; Samuel Cohen, **204/225, 268, 269, 275, 279, 286** [IMAGE AVAILABLE]

67. 4,270,995, Jun. 2, 1981, Electrochemical cell and process; Francis Goodridge, et al., **205/347; 204/268, 270, 276, 277; 205/428** [IMAGE AVAILABLE]

68. 4,252,631, Feb. 24, 1981, Electrostatic coalescence system with independent AC and DC hydrophilic electrodes; A. David Hovarongkura, et al., **204/666, 673** [IMAGE AVAILABLE]

69. 4,197,180, Apr. 8, 1980, Separating solids from liquids; Dennis C. Woodward, **204/275, 286, 294; 205/757, 760**; 210/192, 703 [IMAGE AVAILABLE]

70. 4,159,425, Jun. 26, 1979, Corona reaction system; Frank E. Lowther, 422/186.08; **204/176** [IMAGE AVAILABLE]

71. 4,118,307, Oct. 3, 1978, Batch sodium hypochlorite generator; Ronald L. LaBarre, **204/268, 290F, 290R** [IMAGE AVAILABLE]

72. 4,110,191, Aug. 29, 1978, Separator-electrode unit for electrolytic cells; Steven J. Specht, et al., **204/266, 263, 295, 296** [IMAGE AVAILABLE]

73. 4,042,481, Aug. 16, 1977, Pressure-electrolysis cell-unit; Donald A. Kelly, **204/270, 273, 278, 284; 205/338** [IMAGE AVAILABLE]

74. 3,959,113, May 25, 1976, Square form permeable electrodes for pressure electrolysis process units; Donald A. Kelly, **204/278, 242, 284** [IMAGE AVAILABLE]

75. 3,953,313, Apr. 27, 1976, Electrolytic cell and electrode therefor; Gerald I. P. Levenson, **204/267, 269, 284, 286, 294** [IMAGE AVAILABLE]

76. 3,893,902, Jul. 8, 1975, Electrolytic sea water process; Richard E. Loftfield, et al., **205/350; 204/275; 205/500** [IMAGE AVAILABLE]

77. 3,886,059, May 27, 1975, Guide for electrochemical drilling; Walter E. Mikulski, **204/224M, 225, 286, 297R** [IMAGE AVAILABLE]

78. 3,863,332, Feb. 4, 1975, METHOD OF FABRICATING BACK PANEL FOR LIQUID CRYSTAL DISPLAY; Alex M. Leupp, et al., 438/27; 29/592.1; **205/157;** 216/23, 51; 349/143, 156, 187; 438/30, 587; 445/24 [IMAGE AVAILABLE]

79. 3,793,158, Feb. 19, 1974, DEVICE AND METHOD FOR MEASURING RELATIVE CONCENTRATION CHANGES IN GAS STREAM COMPONENTS; Charles Eugene Hamilton, **205/779.5; 204/431; 205/783, 786.5** [IMAGE AVAILABLE]

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L11 0 SEA FILE=USPAT 2 KWIC

=> d 19 10 22 37 46 62 cit kwic

10. 5,667,667, Sep. 16, 1997, Electrochemical treatment of surfaces; Edwin Southern, **205/687; 204/267, 412; 205/688, 698, 699, 766** [IMAGE AVAILABLE]

US PAT NO: 5,667,667 [IMAGE AVAILABLE] L9: 10 of 79
US-CL-CURRENT: **205/687; 204/267, 412; 205/688, 698, 699, 766**

CLAIMS:

CLMS(1)

I . . .

A method of treating a region of a surface, which method comprises providing an electrolyte overlying the surface, and an **array** of **electrodes** adjacent the surface and in contact with the electrolyte, and altering the potential of one or more of the **electrodes** of the **array** so as to deposit or chemically modify a substance on the surface at the regions adjacent those electrodes, wherein one or more of the **electrodes** of the **array** are used as counter-**electrodes**, and the surface to be modified does not form either an electrode or a counter-electrode.

CLAIMS:

CLMS(2)

2. The method as claimed in claim 1 wherein, for the purpose of performing several electrochemical treatments in sequence, the **electrodes** of the **array** are connected up so that each treatment is performed by altering the potential of a chosen set of one or more of the **electrodes** of the **array**.

CLAIMS:

CLMS(8)

8. The method as claimed in claim 6, wherein there is provided in a) an **array** of **electrodes** adjacent the surface and in contact with the electrolyte, and the potential of one or more of the **electrodes** of the **array** is altered in b).

CLAIMS:

CLMS(9)

9. The method as claimed in claim 8, where one or more of the **electrodes** of the **array** are used as counter-**electrodes**.

CLAIMS:

CLMS(10)

10. A device comprising an **array** of **electrodes** in a form of a

block of insulating material having a first surface provided with **electrodes** spaced apart in an **array**; electrical conducting means for altering the potential of each said electrode; a body having a second surface to be electrochemically. . .

22. 5,532,128, Jul. 2, 1996, Multi-site detection apparatus; Mitchell D. Eggers, et al., 435/6; **204/400, 403**; 422/82.01, 82.02; 435/7.1, 7.2, 287.1, 287.2; 436/518, 524, 525, 527, 806, 809 [IMAGE AVAILABLE]

US PAT NO: 5,532,128 [IMAGE AVAILABLE] L9: 22 of 79
US-CL-CURRENT: 435/6; **204/400, 403**; 422/82.01, 82.02; 435/7.1, 7.2, 287.1, 287.2; 436/518, 524, 525, 527, 806, 809

CLAIMS:

CLMS(20)

20. . . .
said probes being of various structures in order to specifically bind with respective predetermined molecular structures; and circuitry, coupled to said **electrodes**, for measuring capacitive parameters at **multiple** frequencies detect one of a plurality of frequency dependent electrical properties of the test sites to determine whether the probes. . .

37. 5,254,235, Oct. 19, 1993, Microelectrode arrays; Huan P. Wu, **204/284, 286, 400, 434** [IMAGE AVAILABLE]

US PAT NO: 5,254,235 [IMAGE AVAILABLE] L9: 37 of 79
US-CL-CURRENT: **204/284, 286, 400, 434**

CLAIMS:

CLMS(13)

13. . . . to claim 12 wherein said measuring ends of said vertical filaments are coplanar with said measuring surface and define an **array** of microdisk **electrodes**.

CLAIMS:

CLMS(14)

14. The microelectrode according to claim 13 wherein said **array** of microdisk **electrodes** is linear.

CLAIMS:

CLMS(15)

15. The microelectrode according to claim 13 wherein said **array** of microdisk **electrodes** is rectangular.

CLAIMS:

CLMS(16)

16. The microelectrode according to claim 13 wherein said **array** of microdisk **electrodes** is circular or multicircular.

46. 4,940,526, Jul. 10, 1990, Electrophoretic painting apparatus; Stephen P. O'Neill, **204/625** [IMAGE AVAILABLE]

US PAT NO: 4,940,526 [IMAGE AVAILABLE] L9: 46 of 79
US-CL-CURRENT: **204/625**

CLAIMS:

CLMS(7)

7. A cathodic electrophoretic deposition apparatus according to claim 4 wherein said conductor means couple each of said auxiliary **electrodes** within an **array** together in clusters such that the total surface area of all the electrodes in each cluster is approximately equal to. . .

CLAIMS:

CLMS(10)

10. . . .
each said primary electrode of said preceding zones and said power supply for preventing current flow between each of said **electrodes** within the same said **array** through said conducting means; and
second diode means electrically intermediate each said auxiliary electrode and said power supply means for preventing. . .

62. 4,422,917, Dec. 27, 1983, Electrode material, electrode and electrochemical cell; Peter C. S. Hayfield, **204/196.01, 196.38, 242, 268, 269, 290F, 291**; 392/338; 423/609 [IMAGE AVAILABLE]

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US PAT NO:     4,422,917 [IMAGE AVAILABLE]          L9: 62 of 79
US-CL-CURRENT: 204/196.01, 196.38, 242, 268, 269,
                 290F, 291; 392/338; 423/609
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CLAIMS:

CLMS(13)

13. A cell as in claim 12 in which the cell comprises a plurality of bipolar **electrodes** assembled in an **array**, the cell being a chlorate or hypochlorite cell having an aqueous sodium chloride feed and a chlorate or hypochlorite removal. . .

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=> s electroplate (5a) (multiple or different) (5a) (metal# or alloy#)
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u
SEARCH ENDED BY USER

=> s (electroplat? or electrodep?)  (5a) (multiple or different) (5a) (metal# or alloy#)

         16410 ELECTROPLAT?
          9758 ELECTRODEP?
        401645 MULTIPLE
       1269222 DIFFERENT
<------User Break------>
u
SEARCH ENDED BY USER

=> s (electroplat? or electrodep?)  (5a) (multiple or different) (5a) (metal# or alloy# or polymer?)

         16410 ELECTROPLAT?
          9758 ELECTRODEP?
        401645 MULTIPLE
       1269222 DIFFERENT
        861527 METAL#
        154405 ALLOY#
        352355 POLYMER?
L12         99 (ELECTROPLAT? OR ELECTRODEP?)  (5A) (MULTIPLE OR DIFFERENT)
 (5
               A) (METAL# OR ALLOY# OR POLYMER?)

=> s l12 and  l6

L13         57 L12 AND  L6

=> s l13 not fd>1997

          9676 FD>1997
                 (FD>19979999)
L14         57 L13 NOT FD>1997

=> d l14 cit kwic
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1. 5,906,725, May 25, 1999, Method for preparing nickel-zinc-copper or nickel-zinc alloy electroplating solutions from zinc-containing waste articles having a nickel/copper electroplating layer; Jing-Chie Lin, et al., **205/240, 82, 101, 255** [IMAGE AVAILABLE]

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US PAT NO:     5,906,725 [IMAGE AVAILABLE]          L14: 1 of 57
US-CL-CURRENT: 205/240, 82, 101, 255
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SUMMARY:

BSUM(2)

The . . . more particularly to a method for recovering zinc from the zinc-containing waste articles and for preparing a nickel-zinc-copper or nickel-zinc **alloy electroplating** solution from the **multiple electroplating** layers of copper/nickel or copper/nickel/chromium of the zinc-containing waste articles.

=> d 1-57

1. 5,906,725, May 25, 1999, Method for preparing nickel-zinc-copper or nickel-zinc alloy electroplating solutions from zinc-containing waste articles having a nickel/copper electroplating layer; Jing-Chie Lin, et al., **205/240, 82, 101, 255** [IMAGE AVAILABLE]

2. 5,685,970, Nov. 11, 1997, Method and apparatus for sequentially metalized polymeric films and products made thereby; Thomas J. Ameen, et al., **205/138, 165, 166, 186, 187** [IMAGE AVAILABLE]

3. 5,681,443, Oct. 28, 1997, Method for forming printed circuits; Thomas J. Ameen, et al., **205/125, 128, 129, 223** [IMAGE AVAILABLE]

4. 5,560,813, Oct. 1, 1996, Solder electroplating solution containing gelatin; Kwan-Lung Lin, et al., **205/253** [IMAGE AVAILABLE]

5. 5,552,030, Sep. 3, 1996, Method of making a magnetic material in the form of a multilayer film by plating; Kazuo Shimizu, et al., **205/105, 106, 176, 180, 227** [IMAGE AVAILABLE]

6. 5,470,450, Nov. 28, 1995, Edge protector for electrolytic electrode, and spreader bar; Hiroshi Tanaka, et al., **204/279, 281** [IMAGE AVAILABLE]

7. 5,427,676, Jun. 27, 1995, Method of making a cast-to-size mold for molding finished plastic parts; Edward M. Domanski, et al., **205/122**; 156/245; **205/178, 181, 183, 917** [IMAGE AVAILABLE]

8. RE 34,862, Feb. 21, 1995, Electrodeposition process; Doug Czor, **205/67, 70, 72, 109**; 264/227 [IMAGE AVAILABLE]

9. 5,368,717, Nov. 29, 1994, Metallization of electronic insulators; Shimshon Gottesfeld, et al., **205/98, 166** [IMAGE AVAILABLE]

10. 5,368,714, Nov. 29, 1994, Edge protector for electrolytic electrode, spreader bar thereof and method of attaching same to electrolytic electrode; Hiroshi Tanaka, et al., **205/76; 204/279, 281** [IMAGE AVAILABLE]

11. 5,338,433, Aug. 16, 1994, Chromium alloy electrodeposition and surface fixation of calcium phosphate ceramics; George W. Maybee, et al., **205/178; 204/487, 491; 205/176, 243, 255** [IMAGE AVAILABLE]

12. 5,275,703, Jan. 4, 1994, Method of adhering a colored electroplating layer on a zinc-electroplated steel article; Han C. Shih, et al., **205/103, 170, 178** [IMAGE AVAILABLE]

13. 5,250,172, Oct. 5, 1993, Method to fabricate metallic containers by electroplating for use in hot isostatic pressing of metallic and/or ceramic powders; Gregorio Vargas-Gutierrez, et al., **205/70** [IMAGE AVAILABLE]

14. 5,240,783, Aug. 31, 1993, Steel plate for the outside of automobile bodies electroplated with a zinc alloy and a manufacturing method therefor; Tatsuo Kurimoto, et al., 428/659; **205/141, 155, 217**; 428/935 [IMAGE AVAILABLE]

15. 5,209,988, May 11, 1993, Steel plate for the outside of automobile bodies electroplated with a zinc alloy and a manufacturing method therefor; Tatsuo Kurimoto, et al., 428/659; **205/141, 155, 217**; 428/935 [IMAGE AVAILABLE]

16. 5,190,830, Mar. 2, 1993, Method of forming a uniform coating by electrodeposition on integrated ferrous and non-ferrous materials and product thereof; Katsuhiko Matsuo, et al., 428/626; **204/486; 205/114**; 428/653 [IMAGE AVAILABLE]

17. 5,173,170, Dec. 22, 1992, Process for electroplating metals; Craig J. Brown, et al., **205/96, 101, 270** [IMAGE AVAILABLE]

18. 5,112,448, May 12, 1992, Self-aligned process for fabrication of interconnect structures in semiconductor applications; Kishore K. Chakravorty, **205/118, 182, 223, 224, 917**; 216/48, 106; 438/623, 656, 687 [IMAGE AVAILABLE]

19. 5,098,527, Mar. 24, 1992, Method of making electrically conductive patterns; Christopher P. Banks, et al., **205/198; 204/478, 484; 205/221**; 430/325 [IMAGE AVAILABLE]

20. 5,051,317, Sep. 24, 1991, Multilayered electroplating process utilizing fine gold; Hamilton Solidum, 428/671; 63/34; **205/181**; 428/672 [IMAGE AVAILABLE]

21. 5,013,409, May 7, 1991, Electrodeposition process; Doug Czor, **205/67**; 264/227 [IMAGE AVAILABLE]

22. 5,004,672, Apr. 2, 1991, Electrophoretic method for applying photoresist to three dimensional circuit board substrate; Eugene D. D'Ottavio, et al., 430/314; **204/486; 205/184**; 427/98; 430/319 [IMAGE AVAILABLE]

23. 4,988,412, Jan. 29, 1991, Selective electrolytic desposition on conductive and non-conductive substrates; Yung S. Liu, et al., **205/118** [IMAGE AVAILABLE]

24. 4,878,294, Nov. 7, 1989, Electroformed chemically milled probes for chip testing; William P. Dugan, et al., 29/852; **205/78, 122** [IMAGE AVAILABLE]

25. 4,869,971, Sep. 26, 1989, Multilayer pulsed-current electrodeposition process; Chin-Cheng Nee, et al., 428/635; **205/104, 176, 240, 255**; 428/637, 675, 678, 935 [IMAGE AVAILABLE]

26. 4,797,183, Jan. 10, 1989, Electroplated composite of zinc and organic polymer; Yuzo Yamamoto, et al., **205/50, 109, 177, 311, 313, 314** [IMAGE AVAILABLE]

27. 4,789,437, Dec. 6, 1988, Pulse electroplating process; Miu W. Sing, et al., **205/76; 204/DIG.9; 205/104, 264** [IMAGE AVAILABLE]

28. 4,725,340, Feb. 16, 1988, Tartrate-containing alloy bath for electroplating brass on steel wires and procedure for employing the same; Domenico De Filippo, et al., **205/138, 240** [IMAGE AVAILABLE]

29. 4,717,458, Jan. 5, 1988, Zinc and zinc alloy electrolyte and process; Sylvia Martin, et al., **205/246, 245, 306, 307, 308, 309, 310, 311, 312, 313, 314** [IMAGE AVAILABLE]

30. 4,686,016, Aug. 11, 1987, Method of the electrodeposition of a coating on an endless belt; Kurt Held, **205/132, 131, 136** [IMAGE AVAILABLE]

31. 4,650,700, Mar. 17, 1987, Method for surface treatment of metal blanks; Yoichi Kitamura, et al., 427/255.6; **205/192, 704, 741**; 427/318, 319, 386, 405, 410 [IMAGE AVAILABLE]

32. 4,640,758, Feb. 3, 1987, Apparatus for the electrodeposition of a coating on an endless belt; Kurt Held, **204/272** [IMAGE AVAILABLE]

33. 4,600,480, Jul. 15, 1986, Method for selectively plating plastics; Robert L. Coombes, et al., **205/96, 136, 180, 187, 223**; 216/13, 106, 108; 252/79.2; 427/300, 304, 305 [IMAGE AVAILABLE]

34. 4,525,759, Jun. 25, 1985, Aluminum storage disc; Silvester P. Valayil, et al., 360/135; **205/112, 149, 172, 922**; 428/469, 472.2, 629, 650, 667, 694SG, 694ST, 694TP, 694TR, 694TS, 928 [IMAGE AVAILABLE]

35. 4,522,691, Jun. 11, 1985, Method for manufacturing a multicolor filter and a multicolor display device; Mitsuru Suginoya, et al., **205/50; 204/486; 205/122, 188, 229, 317**; 428/432, 461 [IMAGE AVAILABLE]

36. 4,496,437, Jan. 29, 1985, Method for producing a dual porosity body;

James A. McIntyre, et al., 428/613; 204/265, 284; 205/131, 136; 427/230, 236, 239 [IMAGE AVAILABLE]

37. 4,488,942, Dec. 18, 1984, Zinc and zinc alloy electroplating bath and process; Sylvia Martin, et al., 205/245, 246, 307, 308, 309, 310, 312, 313, 314 [IMAGE AVAILABLE]

38. 4,401,526, Aug. 30, 1983, Zinc alloy plating baths with condensation polymer brighteners; Sylvia Martin, 205/245, 246 [IMAGE AVAILABLE]

39. 4,396,474, Aug. 2, 1983, Modified carbon or graphite fibrous percolating porous electrode, its use in electrochemical reactions; Michel Astruc, et al., 205/560; 204/282, 286; 205/562, 566, 575, 594, 598 [IMAGE AVAILABLE]

40. 4,367,123, Jan. 4, 1983, Precision spot plating process and apparatus; Alexander F. Beck, 205/129; 204/224R; 205/133 [IMAGE AVAILABLE]

41. 4,331,517, May 25, 1982, Method of preparing a cathode by high and low temperature electroplating of catalytic and sacrificial metals, and electrode prepared thereby; Thomas A. Rechlicz, 205/176; 204/291, 293, 294; 205/96, 101, 150, 152, 159, 208, 215, 217, 219, 246 [IMAGE AVAILABLE]

42. 4,330,387, May 18, 1982, Modified carbon or graphite fibrous percolating porous electrode, and electrochemical reactors fitted with such an electrode; Michel Astruc, et al., 204/275, 284, 294 [IMAGE AVAILABLE]

43. 4,160,707, Jul. 10, 1979, Process for applying coatings containing both a metal and a synthetic resin; Kees Helle, et al., 205/109 [IMAGE AVAILABLE]

44. 4,118,289, Oct. 3, 1978, Tin/lead plating bath and method; Grace F. Hsu, 205/253 [IMAGE AVAILABLE]

45. 4,098,654, Jul. 4, 1978, Codeposition of a metal and fluorocarbon resin particles; Kees Helle, et al., 205/50; 204/488, 500; 205/109 [IMAGE AVAILABLE]

46. 4,088,545, May 9, 1978, Method of fabricating mask-over-copper printed circuit boards; Fred L. Supnet, 205/125; 427/97 [IMAGE AVAILABLE]

47. 4,021,592, May 3, 1977, Process of making electroplated anodized aluminum articles and electroless plating; Howard A. Fromson, 428/209; 156/237; 205/112, 173; 257/739; 427/271, 304, 305, 306, 405, 437; 428/210; 430/158, 278.1; 502/439 [IMAGE AVAILABLE]

48. RE 29,039, Nov. 16, 1976, Metal deposition process; Timothy Douglas Andrews, 205/187, 75, 164, 167; 427/98, 132, 244, 304, 305, 306, 383.1 [IMAGE AVAILABLE]

49. 3,930,963, Jan. 6, 1976, Method for the production of radiant energy imaged printed circuit boards; Joseph Polichette, et al., 205/126, 125, 150, 159, 187, 191, 205, 210, 224; 427/97, 98, 290, 292, 305, 306, 316; 430/153, 319 [IMAGE AVAILABLE]

50. 3,929,594, Dec. 30, 1975, Electroplated anodized aluminum articles; Howard A. Fromson, 430/278.1; 101/456, 458; 205/112; 430/158, 276.1 [IMAGE AVAILABLE]

51. 3,883,403, May 13, 1975, Apparatus and method for cathode stripping; Victor Alexander Ettel, et al., 205/76; 204/281; 205/261, 269, 271, 291, 305 [IMAGE AVAILABLE]

52. 3,878,061, Apr. 15, 1975, Master matrix for making multiple copies; Nathan Feldstein, 205/75; 204/281 [IMAGE AVAILABLE]

53. 3,711,386, Jan. 16, 1973, RECOVERY OF METALS BY ELECTRODEPOSITION; John M. Gomes, et al., 205/353, 370, 371, 385, 410 [IMAGE AVAILABLE]

54. 3,683,488, Aug. 15, 1972, METHODS OF BONDING METALS TOGETHER; Billy G. Cook, et al., 228/181; 205/114, 150, 181, 182, 228; 228/199, 205, 214, 254 [IMAGE AVAILABLE]

55. 3,671,409, Jun. 20, 1972, ELECTRODEPOSITION OF NICKEL; Ernest Charles Henry Barrett, **205/48, 67, 255, 271** [IMAGE AVAILABLE]

56. 3,642,587, Feb. 15, 1972, CHROMIUM ELECTROPLATING PROCESS AND PRODUCT THEREOF; William S. Allen, et al., **205/50, 142, 179, 223, 917** [IMAGE AVAILABLE]

57. 3,616,286, Oct. 26, 1971, AUTOMATIC PROCESS AND APPARATUS FOR UNIFORM ELECTROPLATING WITHIN POROUS STRUCTURES; John A. Aylward, et al., **205/83; 204/228.6, 275; 205/104, 105** [IMAGE AVAILABLE]

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8. RE 34,862, Feb. 21, 1995, Electrodeposition process; Doug Czor, **205/67, 70, 72, 109;** 264/227 [IMAGE AVAILABLE]

US PAT NO: RE 34,862 [IMAGE AVAILABLE] L14: 8 of 57
US-CL-CURRENT: **205/67, 70, 72, 109;** 264/227

DETDESC:

DETD(12)

The . . . such as made of clay, wax, wood, ceramic or plaster. The process of the present invention is useful for making **multiple** or duplicate **metal electrodeposited** artworks by molding the original object and then electrodepositing a metal onto the mold. The mold may be used more. . .

12. 5,275,703, Jan. 4, 1994, Method of adhering a colored electroplating layer on a zinc-electroplated steel article; Han C. Shih, et al., **205/103, 170, 178** [IMAGE AVAILABLE]

US PAT NO: 5,275,703 [IMAGE AVAILABLE] L14: 12 of 57
US-CL-CURRENT: **205/103, 170, 178**

DETDESC:

DETD(4)

In . . . g/l can result in a white layer, and tin salts of 20-50 g/l can result in a grey layer. Different **metal** salts had **different** contents in the **electroplating** solution.

23. 4,988,412, Jan. 29, 1991, Selective electrolytic desposition on conductive and non-conductive substrates; Yung S. Liu, et al., **205/118** [IMAGE AVAILABLE]

US PAT NO: 4,988,412 [IMAGE AVAILABLE] L14: 23 of 57
US-CL-CURRENT: **205/118**

SUMMARY:

BSUM(11)

The . . . invention by providing a substrate to be plated with a conductive structure having a conductive external surface comprised of two **different metals** and **electroplating** the body in a manner in which electroplating takes place on only one of the two metals. The metal on. . .

33. 4,600,480, Jul. 15, 1986, Method for selectively plating plastics; Robert L. Coombes, et al., **205/96, 136, 180, 187, 223;** 216/13, 106, 108; 252/79.2; 427/300, 304, 305 [IMAGE AVAILABLE]

US PAT NO: 4,600,480 [IMAGE AVAILABLE] L14: 33 of 57
US-CL-CURRENT: **205/96, 136, 180, 187, 223;** 216/13, 106, 108; 252/79.2; 427/300, 304, 305

ABSTRACT:
A . . . provide one or more intermediate metal layers which extends over at least all of the first selected surfaces and then **electroplated** with a final **metal different** from the **metals** of the electroless and intermediate layers at a voltage

whereby the final metal deposits over the first selected surfaces but. . .

SUMMARY:

BSUM(10)

The . . . density is lower at the second selected surfaces than at the first selected surfaces. The electroless plated substrate is then **electroplated** with a second **metal different** from the first **metal** under conditions whereby the second metal deposits over the first selected surfaces, but does not deposit onto the second selected. . . .

37. 4,488,942, Dec. 18, 1984, Zinc and zinc alloy electroplating bath and process; Sylvia Martin, et al., **205/245, 246, 307, 308, 309, 310, 312, 313, 314** [IMAGE AVAILABLE]

US PAT NO: 4,488,942 [IMAGE AVAILABLE] L14: 37 of 57
US-CL-CURRENT: **205/245, 246, 307, 308, 309, 310, 312, 313, 314**

SUMMARY:

BSUM(70)

Zinc alloy baths of the present invention can comprise any of the ingredients necessarily employed in zinc **alloy** electroplating baths. Zinc **alloy electroplating** baths of **different** types generally speaking contain zinc ions in combination with either nickel ions or cobalt ions or a mixture of nickel. . . .

40. 4,367,123, Jan. 4, 1983, Precision spot plating process and apparatus; Alexander F. Beck, **205/129; 204/224R; 205/133** [IMAGE AVAILABLE]

US PAT NO: 4,367,123 [IMAGE AVAILABLE] L14: 40 of 57
US-CL-CURRENT: **205/129; 204/224R; 205/133**

ABSTRACT:
A . . . electrolyte is supplied by force of gravity with a desired hydrostatic head pressure. The substrate can be sequentially advanced to **electrodeposit** spots of **metal** at **different** points on the substrate.

43. 4,160,707, Jul. 10, 1979, Process for applying coatings containing both a metal and a synthetic resin; Kees Helle, et al., **205/109** [IMAGE AVAILABLE]

US PAT NO: 4,160,707 [IMAGE AVAILABLE] L14: 43 of 57
US-CL-CURRENT: **205/109**

SUMMARY:

BSUM(12)

The . . . surface area of the resin particles, and onto the resulting coating serving as a cathode there is subsequently deposited a **metal** from an **electroplating** bath of a **different** composition and, if desired, particles of a different material. Irrespective of the number of metals to be incorporated into the. . .

CLAIMS:

CLMS(11)

11. . . . active compounds containing no completely fluoridized carbon atoms, and depositing onto the resulting coating serving as a cathode from an **electroplating** bath of a **different** composition a **metal** and particles of a different material.

CLAIMS:

CLMS(17)

17. . . . active compounds containing no completely fluoridized carbon atoms, and depositing onto the resulting coating serving as a cathode from an **electroplating** bath of a **different** composition a

metal.

47. 4,021,592, May 3, 1977, Process of making electroplated anodized aluminum articles and electroless plating; Howard A. Fromson, 428/209; 156/237; **205/112, 173**; 257/739; 427/271, 304, 305, 306, 405, 437; 428/210; 430/158, 278.1; 502/439 [IMAGE AVAILABLE]

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US PAT NO:      4,021,592 [IMAGE AVAILABLE]              L14: 47 of 57
US-CL-CURRENT: 428/209; 156/237; 205/112, 173; 257/739; 427/271,
                 304, 305, 306, 405, 437; 428/210; 430/158, 278.1;
                 502/439
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DETDESC:

DETD(20)

It is also possible to form a coated article by electric plating a **different metal** onto the discontinuously **electroplated** surface (for example lead or tin can be electroplated onto a discontinuously electroplated chrome surface according to the invention) to. . .

49. 3,930,963, Jan. 6, 1976, Method for the production of radiant energy imaged printed circuit boards; Joseph Polichette, et al., **205/126, 125, 150, 159, 187, 191, 205, 210, 224**; 427/97, 98, 290, 292, 305, 306, 316; 430/153, 319 [IMAGE AVAILABLE]

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US PAT NO:      3,930,963 [IMAGE AVAILABLE]              L14: 49 of 57
US-CL-CURRENT: 205/126, 125, 150, 159, 187, 191,
                 205, 210, 224; 427/97, 98, 290, 292, 305,
                 306, 316; 430/153, 319
```

ABSTRACT:
Radiant . . . bath to build up conductor lines of electroless metal thereon. In an alternative procedure, conductor lines are built up by **electroplating** with the same or a **different metal** and, optionally, solder coating.

50. 3,929,594, Dec. 30, 1975, Electroplated anodized aluminum articles; Howard A. Fromson, 430/278.1; 101/456, 458; **205/112**; 430/158, 276.1 [IMAGE AVAILABLE]

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US PAT NO:      3,929,594 [IMAGE AVAILABLE]              L14: 50 of 57
US-CL-CURRENT: 430/278.1; 101/456, 458; 205/112; 430/158, 276.1
```

DETDESC:

DETD(20)

It is also possible to form a coated article by electric plating a **different metal** onto the discontinuously **electroplated** surface (for example lead or tin can be electroplated onto a discontinuously electroplated chrome surface according to the invention) to. . .

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=> d his


     (FILE 'USPAT' ENTERED AT 07:48:41 ON 16 JUN 1999)
L1            0 S 204/CLS
L2        37929 S 204/CLAS
L3        24940 S 205/CLAS
L4         1437 S L3 AND APPARAT?/CLM
L5         8674 S L2 AND L3
L6        54195 S L2 OR L3
L7         5280 S L6 AND (ELECTRODES/CLM)
L8          476 S L6 AND  (ARRAY OR MULTIPLE)  (5A) ELECTRODES
L9           79 S L6 AND  (ARRAY OR MULTIPLE)  (5A) ELECTRODES/CLM
L10           5 S L9 AND MASK?/CLM
L11           0 S 2 KWIC
L12          99 S (ELECTROPLAT? OR ELECTRODEP?)  (5A)  (MULTIPLE OR DIFFERE
NT)
L13          57 S L12 AND  L6
L14          57 S L13 NOT FD>1997
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=> d 1-7 cit date kwic

1. 5,700,360, Dec. 23, 1997, Fluoroelastomer gasket for blood sensors; Andy D. C. Chan, et al., **204/400, 403, 409, 415**; 422/68.1, 82.01, 82.02, 82.03 [IMAGE AVAILABLE]

L5: 1 of 7

TITLE:	Fluoroelastomer gasket for blood sensors		
US PAT NO:	5,700,360 [IMAGE AVAILABLE]	DATE ISSUED:	Dec. 23, 1997
APPL-NO:	08/550,884	DATE FILED:	Oct. 31, 1995
US-CL-CURRENT:	**204/400, 403, 409, 415**; 422/68.1, 82.01, 82.02, 82.03		

ABSTRACT:

An . . . primary membranes of electrochemical sensors of both blood gas and ionic species in blood. The elastomer can electrochemically seal an **electrode** of a diced chip (sensor) from a sample chamber, and can electrochemically seal **electrodes** of neighboring diced chips from each other. Significant simplicity in fabrication of multi-sensor analyzers and stopped-flow method using such analyzers. . .

SUMMARY:

BSUM(5)

Such small, planar sensors typically include one or more **electrodes** on a substrate, the **electrodes** being covered by a solid electrolyte which is in turn covered by a **membrane** such as a **semipermeable** or ion selective **membrane** that interacts with the analyte of interest. Such membranes typically are based upon polyvinyl chloride, polytetrafluoroethylene, polyethylene, polypropylene, and the. . .

SUMMARY:

BSUM(6)

One type of electrochemical sensor operates as follows. A sample suspected of containing an analyte is placed in contact with a **semipermeable membrane** of the sensor, the analyte diffuses across the membrane, through an electrolyte, and is oxidized or reduced at an **electrode**, resulting in current flow at that **electrode** (via the solid electrolyte and a second **electrode**). Such an arrangement is typical of a sensor of a gas such as oxygen or carbon dioxide. Another type of. . . sensor, typical of measurement of ionic species such as calcium ion, sodium ion, potassium ion, chloride ion, etc., includes an **electrode** covered optionally by a solid electrolyte and by an ion selective membrane. A fluid sample suspected of containing the analyte contacts the membrane, a second **electrode** also contacts the fluid sample, and a potential is established between the **electrodes**. Interaction of the analyte with a corresponding ionophore in the membrane alters the electrical potential across the membrane, which is measured as a change in potential between the two **electrodes**.

SUMMARY:

BSUM(7)

It . . . an elastomeric material, such as an elastomeric gasket that forms a seal between an edge of the cover and the **semipermeable membrane**. Fabrication of a gasket for use in such an arrangement is, however, not trivial. A material suitable for use as. . .

SUMMARY:

BSUM(8)

It . . . permeability and solubility of the gasket should be low. In sensors that operate by detecting a change in potential between **electrodes** on opposite sides of a primary membrane containing an ionophore (thereby detecting changes in electrical potential across the membrane), the gasket may be required to electrochemically seal the **electrodes** from each other, therefore the electrical resistance across the gasket must be high. In each case, the gasket should not. .

SUMMARY:

BSUM(9)

Electrochemical . . . the sample flows. In a stopped-flow sensor, a fluid sample is brought into contact with the sensing area of a **semipermeable membrane**, and an analyte in the sample is determined while the sample is stationary, or prevented from flowing. Stopped-flow sensor arrangements. . .

SUMMARY:

BSUM(13)

The . . . the container is defined by an elastomeric fluoropolymer. The sensor generally includes a primary membrane that covers one or more **electrodes** and, optionally, an electrolyte. The elastomeric fluoropolymer is contiguous with the primary membrane according to a preferred embodiment. The analyzer. . . one aspect, the gasket forms an electrochemical seal between a side of the membrane that faces the sample and an **electrode** in electrical communication with the other side of membrane. As described below, this is particularly advantageous from the perspective of. . .

SUMMARY:

BSUM(14)

The . . . membranes which define in part such a channel. According to one aspect, the elastomer forms an electrochemical seal between an **electrode** of a sensor on one side of the membrane and components of the system on a side of the membrane opposite of the first side, for example a second **electrode** such as a second working **electrode** or a reference **electrode**. According to another aspect the elastomer forms an electrochemical seal between **electrodes** of two or more sensors in an analyzer.

SUMMARY:

BSUM(15)

The . . . an ionic species at individual sensors, in which each sensor includes an electrochemical seal, formed by the elastomer, between an **electrode** and a surface of a primary membrane opposite the **electrode**. The methods of the invention can be practiced with any suitable devices described.

DETDESC:

DETD(3)

FIG. . . . is approximately flush with a surface 20 of the base. Sensor 14 includes a substrate 22 through which a first **electrode** 24 and a second **electrode** 26 pass. As illustrated in this and subsequent figures, **electrodes** 24 and 26 are electrically crossed, or shorted, such that an essentially one-**electrode** sensor is defined. Sensors having any number of **electrodes** can include the elastomer of the invention, for example one-**electrode** sensors typical of ion sensors, two-**electrode** sensors as described in U.S. Pat. No. 4,536,274, referenced above, three-**electrode** sensors as described in U.S. Pat. No. 5,401,376, referenced above, and sensors having additional **electrodes**. An **array** of sensor chips can be fabricated with any particular number of **electrodes**. Some of the **electrodes** may be crossed, as illustrated in the figures, to effectively reduce the number of **electrodes** if desired. In this way, a single type of chip can be adapted to serve as one of several types. . .

DETDESC:

DETD(4)

An electrolyte layer 28 coats a side of substrate 22 that faces the sensing surface 18 of the sensor, and contacts **electrodes** 24 and 26, and a primary membrane 30 coats electrolyte 28. As used herein, the term "primary membrane" is meant. . . define any of a wide variety of membranes suitable for use in a sensor to separate a sample from an

electrode, and which is adapted to facilitate determination of an analyte. For example, a membrane that contains a species (such as. . . can be carried out, or through which an analyte (such as a gas) can pass from the sample to an **electrode** for determination. As illustrations, **membranes** that are **semipermeable** to a gas such as oxygen are contemplated, as well as heterogeneous membranes such as solvent polymeric membranes or liquid. . .

DETDESC:

DETD(5)

The primary membrane includes a first surface 32 that contacts electrolyte 28, and that is thus in electrical communication with **electrodes** 24 and 26, and a second surface 18 opposite surface 32 that is the sensing surface.

DETDESC:

DETD(15)

According . . . battery metals such as iron, cobalt, nickel, lead, copper, extractables, and species such as sulfides which are deleterious to preferred **electrode** materials, such that electrochemical response is not affected over long-term sensor use, specifically for at least 2 days of normal. . .

DETDESC:

DETD(26)

A gas sensor 44 will include a primary **membrane** 54 that is a **semipermeable membrane** that has the requisite gas permeability properties and electrochemical properties, such as a membrane as described in U.S. Pat. No.. . .

DETDESC:

DETD(28)

FIG. . . . lack of adhesive filler means that electrolyte 28 is exposed at the edge of each of sensors 44 and 46, **electrodes** 24 and 26 are electrochemically sealed from sensing areas 66 and 68 of the sensors by regions 60 of cover. . . or 56. This is particularly important in arrangements in which the sensor operates by measuring a potential difference between an **electrode** 24 or 26 and a reference **electrode** (not shown) that contacts a sample which is also in contact with one of the sensing areas 66 or 68.. . . fluid medium carrying an analyte to be determined at a sensing surface of a membrane, provides electrical resistance between an **electrode** within the sensor and the sensing surface of the membrane (the surface opposite the surface that is intended to be in electrical communication with the **electrode**), via a pathway 149 (as illustrated in connection with sensor 46) that circumvents the primary membrane, that is at least. . .

DETDESC:

DETD(29)

As . . . 58 can include elastomeric portions anywhere so long as the elastomeric portions seal sensing areas 66 and 68 electrochemically from **electrodes** 24 and/or 26. For example, an arrangement can include a cover 58 that is relatively rigid, with a gasket that. . . of the elastomer of the invention, and additional sealing of the edges of the sensors (additional isolation of the sensor **electrodes** or electrolyte from the sample area), for example with adhesive, is not required.

DETDESC:

DETD(30)

The . . . further definition of this term in accordance with the invention, with reference to FIG. 2, includes a seal formed between **electrodes**, or electrolyte 28 of adjacent sensors 44 and 46. That is, where a sensor **electrode** or electrolyte (or other component that is in electrical communication with an sensor **electrode**) is not electrically insulated from a like component of a sensor in the same analyzer, the elastomer of the invention. . . of base 52 that is

bridged by an elastomer, a pathway 147 between electrolyte 28 of adjacent sensors (or between **electrodes** of adjacent sensors) has a resistance at least twice, preferably five times, and more preferably at least ten times as. . . as the resistance across one of the primary membranes of the analyzer. According to this embodiment, the wet resistance between **electrodes** of adjacent sensors is at least 50 gigaohms, preferably at least 100 gigaohms.

DETDESC:

DETD(31)

Sensors . . . the manufacture of an analyzer that contains such sensors together, preferably addressed by a single sample container, in which the **electrodes** of the sensors are electrochemically sealed from each other solely by the elastomer. The electrochemical seal is adequate to allow. . .

DETDESC:

DETD(33)

Above . . . sensors 92 and 94, respectively, and an optional preheater chip 102. Sensors 92 and 94, like sensors described above, include **electrodes** 24 and 26, electrolyte 28, and primary membranes 96 and 98, respectively. Primary membranes 96 and 98 have respective surfaces 103 and 105 that are in electrical communication with sensor **electrodes**, and opposing sensing surfaces 104 and 106. Sensor 92, according to a preferred embodiment, is adapted to determine a gas. . .

DETDESC:

DETD(34)

A . . . respectively, of sensing surfaces 104 and 106. Sensor gasket 108 forms, in each sensor, an electrochemical seal between a sensor **electrode** of each sensor and a fluid sample contacting the sensing area of each sensor, and between **electrodes** (electrolytes) of
<------User Break------>
u
=> d his

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     (FILE 'USPAT' ENTERED AT 20:37:56 ON 16 JUN 1999)
                E SEMIPERM?
L1          6841 S SEMIPERM?
L2          3898 S SEMIPERM? (5A) MEMBRANE#
L3           343 S L2 AND (204/CLAS OR 205/CLAS)
L4           314 S L3 AND ELECTRODE#
L5             7 S L4 AND ARRAY (5A) ELECTRODES
```

=> s l4 and (electro-depos? or electroplat?)

```
         66587 ELECTRO
        349473 DEPOS?
          2070 ELECTRO-DEPOS?
                 (ELECTRO(W)DEPOS?)
         16410 ELECTROPLAT?
L6          16 L4 AND (ELECTRO-DEPOS? OR ELECTROPLAT?)
```

=> d l5 cit ab 1-7

1. 5,700,360, Dec. 23, 1997, Fluoroelastomer gasket for blood sensors; Andy D. C. Chan, et al., **204/400, 403, 409, 415;** 422/68.1, 82.01, 82.02, 82.03 [IMAGE AVAILABLE]

US PAT NO: 5,700,360 [IMAGE AVAILABLE] L5: 1 of 7

ABSTRACT:
An elastomer, especially a fluoropolymeric elastomer, meets requirements necessary for use as a gasket in contact with primary membranes of electrochemical sensors of both blood gas and ionic species in blood. The elastomer can electrochemically seal an **electrode** of a diced chip (sensor) from a sample chamber, and can electrochemically seal **electrodes** of neighboring diced chips from each other. Significant simplicity in fabrication of multi-sensor analyzers and stopped-flow method using such analyzers is realized.

2. 5,622,872, Apr. 22, 1997, Analyte detection through observed optical modulation of polymerized lipid layers; Hans O. Ribi, 436/518; **204/403**; 422/82.08, 82.09; 435/7.1, 7.5, 288.7; 436/532 [IMAGE AVAILABLE]

US PAT NO: 5,622,872 [IMAGE AVAILABLE] L5: 2 of 7

ABSTRACT:
Bioelectronic sensors are provided employing a thin surfactant polymeric electrically conducting layer to which may be bound members of specific binding pairs. Binding of an analyte or a reagent to the specific binding pair member layer may change the electrical, optical, or structural properties of the layer for measurement of analyte. The change in the polymeric layer provides for a sensitive measurement.

3. 5,584,978, Dec. 17, 1996, Collection **electrode** (collectrode) for geo-electrochemical sampling; Richard Van Blaricom, **204/400, 435**; **205/632** [IMAGE AVAILABLE]

US PAT NO: 5,584,978 [IMAGE AVAILABLE] L5: 3 of 7

ABSTRACT:
This invention relates to a novel geo-electrochemical sampling **electrode** and process. More specifically, this invention pertains to a novel ion collection **electrode**, and process, which can be used in the remote sampling of ions contained in ground water. This invention consists of a geo-electrochemical sampling apparatus comprising a hollow electrically non-conductive casing; an opening in the casing for enabling ions to be transported from the exterior of the casing to the interior of the casing, a cathode positioned in the interior of the casing, and electrically connected to the exterior of the casing; and, ion exchange resin contained in the interior of the casing between the cathode and the opening.

4. 5,558,756, Sep. 24, 1996, Method for geo-electrochemical sampling; Richard Van Blaricom, **205/789.5**; **204/400, 435**; **205/632, 775, 789, 792.5, 793** [IMAGE AVAILABLE]

US PAT NO: 5,558,756 [IMAGE AVAILABLE] L5: 4 of 7

ABSTRACT:
This invention relates to a novel geo-electro-chemical sampling **electrode** and process. More specifically, this invention pertains to a novel ion collection **electrode**, and process, which can be used in the remote sampling of ions contained in ground water. This invention consists of a geo-electrochemical sampling apparatus comprising a hollow electrically non-conductive casing; an opening in the casing for enabling ions to be transported from the exterior of the casing to the interior of the casing, a cathode positioned in the interior of the casing, and electrically connected to the exterior of the casing; and, ion exchange resin contained in the interior of the casing between the cathode and the opening.

5. 5,104,639, Apr. 14, 1992, Method for biological testing and/or developing pharmaceuticals for treatment of disorders using electrochromatography; Wayne R. Matson, 514/1; 73/61.52; **205/782, 792**; 424/520, 530, 531, 545, 570; 436/63, 150, 161; 514/419, 567 [IMAGE AVAILABLE]

US PAT NO: 5,104,639 [IMAGE AVAILABLE] L5: 5 of 7

ABSTRACT:
A method for establishing a treatment protocol for correcting an abnormal condition or disease in a living organism is described. The method comprises the steps of analyzing body fluids from normal and abnormal individuals to generate analysis patterns of the normal and abnormal fluids, comparing the patterns to determine differences in the patterns, and establishing a treatment protocol for the abnormal individual through chemical or metabolic therapy which treating will normalize the abnormal pattern.

6. 4,863,873, Sep. 5, 1989, Method for biological testing and/or developing pharmaceuticals for treatment of disorders; Wayne R. Matson, **205/780.5**; 73/61.58; **204/411, 412**; **205/786, 787, 792**; 422/70; 436/63, 68, 150, 161, 175 [IMAGE AVAILABLE]

US PAT NO: 4,863,873 [IMAGE AVAILABLE] L5: 6 of 7

ABSTRACT:
A method for establishing a treatment protocol for correcting an abnormal condition of disease in a living organism is described. The method comprises the steps of analyzing body fluids from normal and abnormal individuals to generate analysis patterns of the normal and abnormal fluids, comparing the patterns to determine differences in the patterns, and establishing a treatment protocol for the abnormal individual through chemical or metabolic therapy which treating will normalize the abnormal pattern.

7. 4,425,215, Jan. 10, 1984, Gas generator; Richard W. Henes, **204/258, 270, 278** [IMAGE AVAILABLE]

US PAT NO: 4,425,215 [IMAGE AVAILABLE] L5: 7 of 7

ABSTRACT:
A gas generator assembly comprising a three plate cell employable in a series of cells to form a generator having a minimum number of parts.

=> d l6 cit ab 1-16

1. 5,837,454, Nov. 17, 1998, Process for the manufacture of wholly microfabricated biosensors; Stephen N. Cozzette, et al., 435/6; **204/403, 411, 412, 414, 415, 416, 417, 419**; 422/57, 82.08; 427/2.11, 2.13, 58, 96; 435/14, 25, 177, 287.1, 287.2, 287.9, 817; 436/518, 524, 528, 806 [IMAGE AVAILABLE]

Get 5,200,661 mailed

US PAT NO: 5,837,454 [IMAGE AVAILABLE] L6: 1 of 16

ABSTRACT:
An efficient method for the microfabrication of electronic devices which have been adapted for the analyses of biologically significant analyte species is described. The techniques of the present invention allow for close control over the dimensional features of the various components and layers established on a suitable substrate. Such control extends to those parts of the devices which incorporate the biological components which enable these devices to function as biological sensors. The materials and methods disclosed herein thus provide an effective means for the mass production of uniform wholly microfabricated biosensors. Various embodiments of the devices themselves are described herein which are especially suited for real time analyses of biological samples in a clinical setting. In particular, the present invention describes assays which can be performed using certain ligand/ligand receptor-based biosensor embodiments. The present invention also discloses a novel method for the electrochemical detection of particular analyte species of biological and physiological significance using an substrate/label signal generating pair which produces a change in the concentration of electroactive species selected from the group consisting of dioxygen and hydrogen peroxide.

2. 5,837,446, Nov. 17, 1998, Process for the manufacture of wholly microfabricated biosensors; Stephen N. Cozzette, et al., 435/6; **204/400, 411, 412, 413**; 422/57, 82.08; 435/14, 25, 177, 287.1, 287.2, 817; 436/149, 150, 151, 518, 528, 531, 532, 806 [IMAGE AVAILABLE]

US PAT NO: 5,837,446 [IMAGE AVAILABLE] L6: 2 of 16

ABSTRACT:
An efficient method for the microfabrication of electronic devices which have been adapted for the analyses of biologically significant analyte species is described. The techniques of the present invention allow for close control over he dimensional features of the various components and layers established on a suitable substrate. Such control extends to those parts of the devices which incorporate the biological components which enable these devices to function as biological sensors. The materials and methods disclosed herein thus provide an effective means for the mass production of uniform wholly microfabricated biosensors. Various embodiments of the devices themselves are described herein which are especially suited for real time analyses of biological samples in a clinical setting. In particular, the present invention describes assays which can be performed using certain ligand/ligand receptor-based biosensor embodiments. The present invention also discloses a novel method for the electrochemical detection of particular analyte species of biological and physiological significance using an substrate/label signal generating pair which produces a change in the concentration of

electroactive species selected from the group consisting of dioxygen and hydrogen peroxide.

3. 5,616,246, Apr. 1, 1997, Hydrophilic membranes for electrochemical devices and method for preparing same; David R. Gagnon, et al., 210/490; **204/290R**; 210/500.42 [IMAGE AVAILABLE]

US PAT NO: 5,616,246 [IMAGE AVAILABLE] L6: 3 of 16

ABSTRACT:
Articles having a complex geometric configuration have hydrophilicity imparted to at least a portion of surfaces of the articles while substantially retaining the complex geometric configuration. The hydrophilicity is imparted by an extremely thin, self-interlocking shell of tactic, hydrophilic poly(vinyl alcohol) enveloping the surfaces. A tactic poly(vinyl alcohol) precursor applied to surfaces of the supporting structure is reacted in situ on the surfaces with a hydrolysis reagent to prepare the tactic, hydrophilic poly(vinyl alcohol) shell. The article having the hydrophilic shell is highly resistant to solvent washout. Hydrophilicity and hydrophobicity can be reversibly provided on regio-specific surfaces of the article. Articles in the form of membranes useful as residue barriers for **electroplating** devices, and separators for electrochemical cells are also described.

4. 5,547,553, Aug. 20, 1996, Mercury thread **electrode**; Husantha G. Jayaratna, **204/413**, **409**, **412**, **415**; 436/52, 53, 73, 74, 75 [IMAGE AVAILABLE]

US PAT NO: 5,547,553 [IMAGE AVAILABLE] L6: 4 of 16

ABSTRACT:
An improved mercury **electrode** for electrochemical analysis is formed by a small diameter thread of liquid mercury contained within an inert tube which, at one point along its length, has an short, fixed length of thin walled tubular **semipermeable membrane** surrounding and forming the **electrodes**' active surface in order to prevent or reduce fouling of the surface while allowing the mercury thread to be advanced through the membrane to expose a fresh active surface whenever desired.

5. 5,466,575, Nov. 14, 1995, Process for the manufacture of wholly microfabricated biosensors; Stephen N. Cozzette, et al., 435/6; **204/403**, **411**, **412**, **414**, **415**, **416**, **417**, **418**, **419**, **430**, **431**, **432**; 422/82.01; 427/2.13, 96; 435/177, 817; 436/149, 806 [IMAGE AVAILABLE]

US PAT NO: 5,466,575 [IMAGE AVAILABLE] L6: 5 of 16

ABSTRACT:
An efficient method for the microfabrication of electronic devices which have been adapted for the analyses of biologically significant analyte species is described. The techniques of the present invention allow for close control over the dimensional features of the various components and layers established on a suitable substrate. Such control extends to those parts of the devices which incorporate the biological components which enable these devices to function as biological sensors. The materials and methods disclosed herein thus provide an effective means for the mass production of uniform wholly microfabricated biosensors. Various embodiments of the devices themselves are described herein which are especially suited for real time analyses of biological samples in a clinical setting. In particular, the present invention describes assays which can be performed using certain ligand/ligand receptor-based biosensor embodiments. The present invention also discloses a novel method for the electrochemical detection of particular analyte species of biological and physiological significance using an substrate/label signal generating pair which produces a change in the concentration of electroactive species selected from the group consisting of dioxygen and hydrogen peroxide.

6. 5,211,831, May 18, 1993, Process for extending the life of a displacement plating bath; Americus C. Vitale, et al., **205/85**, 101; 427/98, 345, 436 [IMAGE AVAILABLE]

US PAT NO: 5,211,831 [IMAGE AVAILABLE] L6: 6 of 16

ABSTRACT:
A stabilized spray displacement tin plating process of copper printed circuit innerlayers is disclosed for the manufacture of multilayer printed circuit boards. During prolonged use of spray tin plating, the

plating solution becomes saturated with cupurous thiourea complex which precipitates interfering with spray nozzles and other mechanical components. The tin plating solution is stabilized by removing portions from the reservoir before saturation is reached, selectively precipitating the thiourea complex, and returning the remaining solution back to the reservoir. The precipitated cupurous thiourea complex is redissolved in acid and either disposed of by conventional waste treatment or the acid solution can be electrowinned to reclaim copper and oxidize thiourea to form a more acceptable acid solution for waste treatment. Preferably, the thiourea is isolated from the anode during electrowinning, so that the acid thiourea solution formed may be used to partially replenish the tin plating solution in the reservoir. By such periodic removal of the complex, the plating bath is stabilized and its useful life is extended dramatically.

7. 5,200,051, Apr. 6, 1993, Wholly microfabricated biosensors and process for the manufacture and use thereof; Stephen N. Cozzette, et al., **204/403, 415**; **205/778, 782.5**; 422/930; 435/287.9 [IMAGE AVAILABLE]

US PAT NO: 5,200,051 [IMAGE AVAILABLE] L6: 7 of 16

ABSTRACT:
An efficient method for the microfabrication of electronic devices which have been adapted for the analyses of biologically significant analyte species is described. The techniques of the present invention allow for close control over the dimensional features of the various components and layers established on a suitable substrate. Such control extends to those parts of the devices which incorporate the biological components which enable these devices to function as biological sensors. The materials and methods disclosed herein thus provide an effective means for the mass production of uniform wholly microfabricated biosensors. Various embodiments of the devices themselves are described herein which are especially suited for real time analyses of biological samples in a clinical setting. In particular, the present invention describes assays which can be performed using certain ligand/ligand receptor-based biosensor embodiments. The present invention also discloses a novel method for the electrochemical detection of particular analyte species of biological and physiological significance using an substrate/label signal generating pair which produces a change in the concentration of electroactive species selected from the group consisting of dioxygen and hydrogen peroxide.

8. 5,063,081, Nov. 5, 1991, Method of manufacturing a plurality of uniform microfabricated sensing devices having an immobilized ligand receptor; Stephen N. Cozzette, et al., 435/4; **204/403, 415, 418**; 422/57, 930; 427/2.13, 407.1, 414; 435/7.1 [IMAGE AVAILABLE]

US PAT NO: 5,063,081 [IMAGE AVAILABLE] L6: 8 of 16

ABSTRACT:
A plurality of uniform microfabricated sensing devices are produced by establishing a plurality of base sensors on a substrate wafer, forming over at least a portion of each base sensor a permselective layer, superimposing a photoformable proteinaceous photoresist layer over a substantial portion of the permselective layer, and forming a topmost layer of an immobilized ligand receptor. The ligand receptor and corresponding ligand may be immunoreactive species.

9. 5,024,744, Jun. 18, 1991, Stamper cleaning apparatus; Norio Okabayashi, **204/194**; 134/61, 88, 113, 135, 198; **204/232, DIG.13** [IMAGE AVAILABLE]

US PAT NO: 5,024,744 [IMAGE AVAILABLE] L6: 9 of 16

ABSTRACT:
A stamper cleaning apparatus comprises an electrocleaning tank for performing electrodegreasing, a washing room adjacent to this cleaning tank, a shower, disposed in the upper section of the washing room, for water-washing a stamper by spraying washing water onto the stamper while the stamper is positioned inside the washing room and is wet with an electrocleaning solution, a water drain tank, disposed in the lower section of the washing room, for collecting water after the stamper is washed with water and for draining the water, and a small drying room disposed in the upper section of the washing room for operating to heat and dry the stamper after the shower has operated during the predetermined time the stamper is held in the washing room.

10. 4,857,159, Aug. 15, 1989, Electrodeposition recovery method for metals in polymer chelates; James C. Davis, et al., **205/510**; 75/723; **205/560, 568, 572, 575, 581, 590, 598, 611, 702**; 210/748 [IMAGE AVAILABLE]

US PAT NO: 4,857,159 [IMAGE AVAILABLE] L6: 10 of 16

ABSTRACT:
The process of the present invention for the recovery of metal ions from a polymeric chelating agent stream or solution comprises the circulation of a loaded polymeric chelating agent stream or solution through an electrolytic recovery cell. The chelating agent is loaded with metal ions or complexes of the species to be recovered which have been extracted from a feed stream or solution. These metal ions or complexes will be reduced and recovered from the chelating polymer by an electrodeposition method. If the chelating agent is used in a continuous flow-type system, the lean polymeric chelating agent can optionally be recycled for further use in extraction of the desired metal species. The addition of scrub and regeneration stages to such a system is optional, depending on feed stream composition.

11. 4,695,356, Sep. 22, 1987, Electrochemical procedure for the direct forming of generally thin elements with various contours and surfaces of usual and technical ceramics or refractory material; Henri Vander Poorten, **204/483, 490, 623; 205/72, 220** [IMAGE AVAILABLE]

US PAT NO: 4,695,356 [IMAGE AVAILABLE] L6: 11 of 16

ABSTRACT:
In a process and apparatus for producing ceramic tiles, such as wall tiles and floor tiles, including thin tiles of a size up to a square meter, metal **electrode** plates having thereon three-dimensional design and insulating paint or tape defining the boundaries of one or more tiles to be produced, are transported by a conveyor system through a bath of finely divided ceramic material suspended in an aqueous electrolyte while applying an electric potential between the plates and a counter **electrode** in the bath to produce electrodeposition of ceramic material from the bath onto conductive portions of the plates bounded by the insulating material. The voltage and time of travel in the bath are selected to produce a deposit of ceramic material with a thickness of from 1 to 20 mm. After leaving the bath, the plates, with the deposits thereon are transported through a water spray rinsing station and a drying atmosphere to a transfer station at which the deposits, constituting green tiles, are transfered to refractory supports by which they are carried through a tunnel furnace for further drying and firing. From the transfer station, the plates are further transported through a reconditioning station and back to the bath. Thin flexible water-wettable membranes applied to the plates before deposit of ceramic material thereon facilitate removal of the green tiles from the plates at the transfer station without damage.

12. 4,461,680, Jul. 24, 1984, Process and bath for **electroplating** nickel-chromium alloys; David S. Lashmore, **205/104; 204/DIG.9; 205/176, 243, 259** [IMAGE AVAILABLE]

US PAT NO: 4,461,680 [IMAGE AVAILABLE] L6: 12 of 16

ABSTRACT:
A process for the electrodeposition of a nickel chromium alloy on a catho substrate comprises:
contacting the substrate with an aqueous electrolyte containing: about 50-125 g/l of CrCl.sub.3.6H.sub.2 O; about 10-125 g/l of NiCl.sub.2.6H.sub.2 O; about 10-115 g/l of formic acid; about 25-50 g/l of boric acid; and about 50-100 g/l of sodium citrate dihydrate;
adjusting the pH of the bath to about 1-5 and the temperature to about 20.degree.-60.degree. C.; and
passing a sufficient current through the solution and to the substrate to effect deposition thereon of a nickel-chromium alloy.

13. 4,390,405, Jun. 28, 1983, Oxygen **electrode** and method for preparation thereof; Allen W. Hahn, et al., **204/415**; 427/488 [IMAGE AVAILABLE]

US PAT NO: 4,390,405 [IMAGE AVAILABLE] L6: 13 of 16

ABSTRACT:
An oxygen **electrode** adapted for use for polarographic, galvanometric

or amperometric analyses, that is resistant to poisoning and effective for accurate, reproducible current and voltage measurements. The **electrode** comprises a conductive sensing member having a working surface which is comprised of a metal that catalyzes the cathodic reduction of oxygen and which is adapted to communicate with an oxygen-containing environment for carrying out such reduction. At the working surface is a layer of an oxide of the aforesaid metal. An insulating jacket covers all of the member except the working surface. There is a thin polymeric coating over said oxide layer and securely adhered to the working surface. The coating comprises a polymer produced by glow discharge polymerization of an aliphatic hydrocarbon and has such properties as to permit the reduction of oxygen at the **electrode** by electrons supplied at the working surface through the conductive member. A method for preparing the **electrode** is also disclosed.

14. 4,311,771, Jan. 19, 1982, Process for production of electrical energy from the neutralization of acid and base in a bipolar membrane cell; James F. Walther, 429/51; **204/534**; 429/14, 101 [IMAGE AVAILABLE]

US PAT NO: 4,311,771 [IMAGE AVAILABLE] L6: 14 of 16

ABSTRACT:
Electrical energy is generated from acid-base neutralization reactions in electrodialytic cells. Permselective bipolar membranes in these cells are contacted on their cation selective faces by aqueous acid streams and on their anion-selective faces by aqueous base streams. Spontaneous neutralization reactions between the basic anions and acidic cations through the bipolar membranes produce electrical potential differences between the acid and base streams. These potential differences are transmitted to **electrodes** to produce electrical energy which is withdrawn from the cell.

15. 4,268,662, May 19, 1981, Process for improving **semipermeable membranes** by treating with protic acids or inorganic salts; Takezo Sano, et al., 528/486; **204/165**; 210/500.43; 264/413, 483; 528/485, 487, 488 [IMAGE AVAILABLE]

US PAT NO: 4,268,662 [IMAGE AVAILABLE] L6: 15 of 16

ABSTRACT:
A process for improving the performances of **semipermeable membranes** which comprise an acrylonitrile polymer containing 40 to 100% by mole of acrylonitrile and have a bubble point of more than 0.1 kg/cm.sup.2, by dipping said membranes in an aqueous solution containing inorganic salts and/or protic acids.

16. 3,616,396, Oct. 26, 1971, ELECTROPHORETIC COATING PROCESS; Ralph G. Swanson, **204/482** [IMAGE AVAILABLE]

US PAT NO: 3,616,396 [IMAGE AVAILABLE] L6: 16 of 16

ABSTRACT:
An improved process for the electrophoretic deposition of a coating on a metal article in which the bath contains an electrically charged film-forming material and a porous partition which separates the article being coated (e.g., the anode) from **electrode** (e.g., the cathode) and in which a portion of the bath which is deficient in film-forming material is removed and replenished with film-forming material and recycled into the bath in the proximity of the article being coated. An apparatus having the required novel features necessary for the improved electrophoretic process is also disclosed.

US PAT NO: 4,695,356 [IMAGE AVAILABLE]
US-CL-CURRENT: 204/483, 490, 623; 205/72, 220

ABSTRACT:
In a process and apparatus for producing ceramic tiles, such as wall tiles and floor tiles, including thin tiles of a size up to a square meter, metal **electrode** plates having thereon three-dimensional design and insulating paint or tape defining the boundaries of one or more tiles to be produced, are transported by a conveyor system through a bath of finely divided ceramic material suspended in an aqueous electrolyte while applying an electric potential between the plates and a counter **electrode** in the bath to produce electrodeposition of ceramic material from the bath onto conductive portions of the plates bounded by the insulating material. The voltage and time of travel in the bath are selected to produce a deposit of ceramic material with a thickness of from 1 to 20 mm. After leaving the bath, the plates, with the deposits thereon are transported through a water spray rinsing station and a drying atmosphere to a transfer station at which the deposits, constituting green tiles, are transfered to refractory supports by which they are carried through a tunnel furnace for further drying and firing. From the transfer station, the plates are further transported through a reconditioning station and back to the bath. Thin flexible water-wettable membranes applied to the plates before deposit of ceramic material thereon facilitate removal of the green tiles from the plates at the transfer station without damage.

SUMMARY:

BSUM(3)

In the specification of the Belgian Pat. No. 873,378 in the name of the applicant, there is described an electrochemical procedure that allows in a single process the casting, moulding, contouring, shaping and surface treatment of elements from raw materials in the form of charged suspended particles and which gives rise to conductive electrodeposits by an **electrode** reaction that is rigorously controlled.

SUMMARY:

BSUM(18)

This technique therefore consists of selectively **masking** the anodes, realising that on an electrically insulated spot no deposit will be obtained at the time of the electrolysis. Such selective **masking** can also be obtained on ion exchange or **semipermeable membranes** applied to the anode prior to the disposition of ceramic material thereon. In the areas that have not been insulated, ceramic material will be electrodeposited and develop up to the insulated contours. At the insulated edges, the electrodeposited material takes on spontaneously the rounded edge feature which conforms to the electric field lines at the border between conducting and insulating zones.

SUMMARY:

BSUM(19)

It is possible by classical means used in **electroplating** to exploit the border effect either by deliberately increasing the thickness at the periphery of the tiles or by attenuating this effect.

DRAWING DESC:

DRWD(14)

FIG. 4a: a schematic perspective view of one of the **electrode** plates with a membrane applied thereto, and

DRAWING DESC:

DRWD(15)

FIG. 4b a schematic edge view of an **electrode** plate with a membrane and ceramic material deposited thereon to form a green tile.

DETDESC:

DETD(11)

With the plain plates 1 that are used for the fabrication of flat tiles, it is possible to fabricate structures in space and to give any form to the plate either by embossing, curving, folding, welding. The technique then becomes a matter of fabricating shapes, for example some shapes that can be obtained for such tiles are curved, (FIG. 3a), right-angled (FIG. 3b), U-shaped (FIG. 3c), corners (FIGS. 3d and 3d primed), cloisters (FIG. 3e), straight tubes or bent, the contours of these structures being always limited by the technique of selectively **masking** the sheet metal or the membranes by means of paint or the membranes by means of paint or insulating tape.

DETDESC:

DETD(12)

Tiles with a rough surface texture more or less irregular, which imitates pumice stone or lava can be obtained on **electrodes** metalised with a spray gun or a plasma torch. By way of example, the metalisation of metallic or non-metallic (plastic organic materials) supports by means of a spray gun with zinc is very well suited to prepare **electrodes** for this type of tile with an irregular rough surface.

DETDESC:

DETD(15)

In photoengraving on a metallic plate, it is the plate itself which serves as the **electrode** for fabricating the tile. In those cases, it is understood that the surface of the tile against the **electrode** exhibits the engraving. One can in this way reproduce texts and designs with line engravings or photographs of landscapes, or persons, or pictures etc. In these last cases the negative is reproduced by photoengraving, using the hatching process to apply a texture across the entire space.

DETDESC:

DETD(21)

These reproductions can be made on flat tiles or shaped tiles; to do this it is sufficient to use the engraved plates as **electrodes** by incorporating the engraved plates in **electrodes** of a larger format to create an ensemble of ceramic elements in which all or only certain elements compose the reproduction of a motif.

DETDESC:

DETD(22)

Attenuated reliefs can be obtained on the tiles on the side opposite to that in contact with the metal. To do this one used a property which we have discovered in the fundamental study of the mechanism of electrodeposition of ceramics, namely that the nature of the metal **electrode** influences the rate of electrodeposition. It is therefore possible to exploit this property to obtain relief. It is sufficient to create a metallic deposit according to a predetermined design on certain areas of the **electrode**. If the applied metal accelerates the rate of electrodeposition then it will appear on these spots as a relief at the exterior surface of the deposit. If the applied metal on the **electrode** is in contrast one that reduces the rate of electrodeposition it will correspondingly appear on these spots as hollows at the external surface of the tile. By way of an example, localised copper plating on a plate or zinc will produce hollows in the ceramic. Inversely on a plate of copper localised zinc deposits will provoke zones in relief. The couples Zn-Al, Cu-Al, Zn-Al as well as Fe-Zn can be exploited to product attenuated relieves which present the very great advantage of being obtained on **electrodes** which remains practically flat. The metallic deposit of extra thickness on the plates are actually of a thickness less than one tenth of a millimeter.

DETDESC:

DETD(23)

The metal plates are prepared by the usual technique of

electroplating after sections of the base plate have been insulated to avoid the deposition of metal on to them.

DETDESC:

DETD(29)

The plates 1, which serve as anodes, are transported on a conveyor 8; on entering the cell they are placed under a potential from the electric rail 9 through a gliding or rotating contact attached to each plate. The fixed counter **electrode** which is constantly immersed in the bath and serves as cathode is situated at 10. As the plates 1 move through the bath, a voltage of from 10 v to 60 v is applied to the plates through the contact with the rail 9 to cause ceramic material of the bath to be deposited on the conductive portions of the plate. Metallic cations coming from the **electrode** must diffuse in the deposit and not accumulate on the metallic surface in order to build up a deeper layer of ceramic material. The rate at which the plates are transported through the batch is a function of the length of the cell, the voltage applied to the plates, the composition of the bath and the desired thickness of the tile to be produced. For a thickness of from 1 mm to 20 mm, the time the plates are in the bath is from 1 to 20 minutes. At the down stream end of the cell, the plates, with the tile or tiles that have been formed thereon, are raised out of the bath by the conveyor 8 and are disconnected from the electric rail 9.

DETDESC:

DETD(30)

As the ceramic material is deposited on the **electrode** plates, it confirms to the surface contour and characteristics of the plate. Moreover, if there are areas of greater surface conductivity, the ceramic material will deposit more rapidly in these areas so as to form attenuated reliefs on the tiles on the side opposite to that in contact with the metal. At the boundaries of the tiles defined by insulation on the plates, the edges are automatically rounded as illustrated in FIG. 1b. When two or more tiles are being formed on the same plate by means of separating strips of insulation as illustrated in FIGS. 2a to 2d, the insulating strips are of sufficient width that edges of adjacent tiles do not meet.

DETDESC:

DETD(31)

During the electrolysis, adherence of the deposited ceramic material to the **electrode** plate must be preserved, but when the **electrode** plate with the deposit thereon is extracted from the bath, stripping of the "green" tile from the plate without damage must be possible. The problem of stripping is more difficult when the tiles are thin and of large area.

DETDESC:

DETD(34)

The membranes facilitate removal of the "green" tiles from the plates and transfer to a supporting surface without damaging the tiles. This is of particular importance in the case of thin tiles of large size, for example, tiles having a thickness of 3 mm and an area of a square meter. Moreover, they prevent direct contact of the electrodeposited ceramic material with the **electrode** plate and by virtue of their non-permeability to gases prevent gases evolved on the **electrode** from entering the electrodeposited material to cause porosity. The membranes can also be used to control humidity at the **electrode** surface in order to avoid excessive shrinkage of the ceramic material upon drying. The membranes can also be used to enhance the local conditioning of the **electrode** surface as regards surface conductivity. For this purpose various elements (ions or molecules) with an activating or depressing effect, depolarization and coloring effects can be incorporated in the membranes.

DETDESC:

DETD(36)

The membranes are easily applied to the **electrode** plates prior to

deposition of ceramic material on the plates, for example by wetting the plate and membrane and rolling or brushing the membrane onto the plate surface. The rolling or brushing is effected from one edge of the plate to the opposite edge in order to remove any air bubbles from between the plate and the membrane. The wetted membrane thereupon adheres to the wetted plate. Usually, the membrane is applied directly to the surface of the plate. However, in some cases cloth or felt is intercalated between the **electrode** and the membrane in order to avoid oxygen bubbles in the deposit ceramic material.

DETDESC:

DETD(37)

Alternatively, the membrane, instead of being in contact with the anodes, can be tight on nylon gratings or reinforced by nylon canvas forming a separation between an anodic compartment containing floculating cations and an inert anode with oxygen evolution and the suspension of ceramic material. These membranes are preferably specific cationic exchange membranes like polyfluorohydrocarbons, copolymers of tetrafluoroethylene and vinyl sulphoyl-fluoride of 0.1 to 1 mm thickness or simply **semipermeable membranes** permitting diffusion of cations like H.sup.+, Na.sup.+, K.sup.+, Ca.sup.+, Mg.sup.+, Al.sup.3+ which may not be produced by soluble anodes.

DETDESC:

DETD(39)

After removal from the **electrode** plates 1, the green tiles are carried by the refractory floor tiles 12 moving on rollers into and through a tunnel furnace 14 where the tiles are further dried and fired. The baked tiles emerge from the furnace at 15.

DETDESC:

DETD(42)

Glazing, which is not represented in FIG. 4 can be included into the fabrication chain. This can be done by using a powdered glaze feed before firing or by the technique of the inked roller. In that case, the surface of the tile on the **electrode** side is best glazable. With a spray gun depositing enamel it is possible to glaze in colour on engraved tiles.

CLAIMS:

CLMS(1)

What I claim is:

1. A process for producing ceramic tiles which comprises:
providing a plurality of metallic plates, each of an area greater than that of tiles to be produced,
applying to a surface of each of said plates electrical insulating material defining the boundaries of at least one active area of said surface for producing at least one tile,
providing on said surface electrically conductive separating means for temporary adhesion of electrodeposited ceramic material on said active area and subsequent removal of said electrodeposited material from said plate,
transporting said plates sequentially through a bath of finely divided ceramic material suspended in an aqueous electrolyte,
applying an electrical potential of selected value between said plates while in said bath and a counter **electrode** to produce electrodeposition of ceramic material from said bath onto said active area of said surface of each of said plates within the boundaries defined by said insulating material, the value and time of application of said potential being selected to build up on said active area of said surface of said plate a deposit of ceramic material having a thickness of from 1 mm to 20 mm,
removing said plates sequentially from said bath with said deposits on said plates and partially drying said deposits to constitute green tiles,
stripping said green tiles intact from said plates onto heat resistant supports,
transporting said supports with said green tiles thereon into a furnace and there firing said tiles.

CLAIMS:

CLMS(16)

16. Apparatus for producing ceramic tiles which comprises:
an elongate tank containing a bath of finely divided ceramic material suspended in an aqueous electrolyte and a counter **electrode**,
a plurality of metallic plates each having a surface of an area greater than that of tiles to be produced and having applied to said surface insulating material defining the boundaries of at least one active area of said surface for producing at least one tile and electrically conductive separating means for temporary adhension of electrodeposited ceramic material on said active area and subsequent removal of said electrodeposited material from said plate,
means for transporting said plates sequentially through said bath at a selected rate,
means for applying an electrical potential of selected value between said plates while in said bath and said counter **electrode** to produce electrodeposition of ceramic material from said bath onto said surface of said plates within the boundaries defined by said insulating material, the value of said potential and the rate of transport of said plates being selected to build up on said surface of said plates a deposit of ceramic material having a thickness of from 1 mm to 20 mm,
means for transporting said plates with said deposits thereon from said bath, through an atmosphere in which said deposits are partially dried to constitute green tiles, and then to a transfer station for stripping said green tiles from said plates,
a firing furnace, and
support means for receiving said green tiles at said transfer station and conveying them into said furnace for firing.

CLAIMS:

CLMS(18)

18. Apparatus according to claim 16, in which said means for supplying voltage between said plates and said counter **electrode** comprises an electric rail extending over said bath and means carried by each of said plates contacting said rail as said plates are transported through said bath.

CLAIMS:

CLMS(20)

20. Apparatus for producing ceramic tiles which comprises:
a plurality of metallic plates each of an area greater than that of tiles to be produced and having applied to a surface thereof insulating material defining the boundaries of at least one active area of said surface for producing at least one tile and electrically conductive separating means for temporary adhesion of electrodeposited ceramic material on said active area and subsequent removal of said electrodeposited material from said plate,
a tile forming station comprising an elongate tank containing a bath of finely divided ceramic material suspended in an aqueous electrolyte for receiving said plates, a counter **electrode** in said bath and means for applying an electrical potential between said plates received in said bath and said counter **electrode** to produce electrodeposition of ceramic material from said bath onto said surfaces of said plates within the boundaries defined by said insulating material to buildup on said surfaces of said plates a deposit of ceramic material for forming tiles,
a drying station wherein said plates after removal from said bath with said deposits thereon are subjected to a dehydrating atmosphere for partially drying said deposits to constitute green tiles,
a transfer station wherein green tiles are stripped intact from said plates and transferred to heat resistant supports,
transport means for transporting said plates through said bath at a rate selected to provide a period of time in said bath for building up on said plates deposits of ceramic material of a thickness of from 1 mm to 20 mm, and through said drying station to said transfer station, and
a firing station comprising a firing furnace, and means for conveying said heat resistant supports with said green tiles thereon into said furnace for firing.

CLAIMS:

CLMS(21)

21. A process for producing ceramic tiles which comprises:

providing a metal plate having a surface of an area greater than that of tiles to be produced,

applying to a surface of said plate electrical insulating material defining boundaries of at least one active area of said surface for producing at least one tile,

applying to said surface of said plate a membrane having the properties of good wettability by water and good ionic conductivity

immersing said plate with said membrane thereon in a bath of finely divided ceramic material suspended in an aqueous electrolyte and applying an electric potential between said plate and a counter **electrode** in said bath to produce electrodeposition of ceramic material from said bath onto said surface of said plate within boundaries defined by said insulating material to build up on said plate within said boundaries a deposit of ceramic material having a thickness of from 1 mm to 20 mm,

removing said plate from said bath and partially drying said deposit thereon to constitute a green tile,

stripping said green tile with said membrane from said plate and depositing it on a heat resistant support, and

transporting said support with said green tile thereon into a furnace and there firing said tile.